FORESTERI

2008 / 2008T

OPERATION

SERVICE

SPARE PARTS

KESLA OYJ

DECLARATION OF CONFORMITY

We,
KESLA OYJ
PL 282
80101 JOENSUU
FINLAND,

declare solely at our own risk that the following product:

Type: _____

Serial number: _____

is in conformity with the requirements and provisions of the following directives: Machinery Directive 89/392/EEC and directive 98/37/EU supplementing it, as well as Directive on Electromagnetic Compatibility 89/336/EEC, amended with directives 92/31/EEC and 93/68/EEC.

Before implementation of the product, the installation firm (fitter) shall affirm that the fitting conforms to to the requirements of the above directives as concerns fitting the product to a truck, tractor or other chassis and, in so far as the above is concerned, a new declaration of conformity must be made and a CE marking attached.

Name:

Esko Paajanen

Position: Managing Director

Date: *Joensuu* _____

KESLA OYJ

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SUMMARY

1. *As the very first step read the manual.*

2. *Check that the hydraulic system of the base machine matches with the specification and the stability has been verified and is in accordance with regulations.*

3. *Follow the fitting instructions. The seller and the manufacturer will be pleased to give you further information, if needed.*

4. *Do not forget the inspections provided in law.*

5. *Always work with good judgement.*

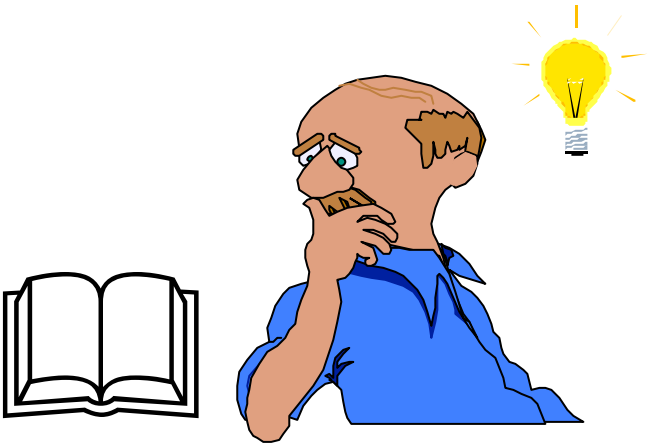
6. *Do not forget to warm up the hydraulic system in freezing conditions.*

7. *Grease often with small amounts instead of infrequently with great amounts.*

8. *Cleanness is essential for the hydraulic system.*

9. *First filling oil: SHF 32, class API SD.*

10. *Repair even minor faults immediately to avoid serious damage.*



USE OF THE MANUAL

Each Foresteri crane delivery includes an owner's manual.

This manual is drawn up for operators with earlier practice of handling timber cranes.

**) The asterisk notifies information on the subject issue.*

-) The dash indicates necessary / possible steps to be taken.

The WARNING! symbol denotes a very important safety instruction.

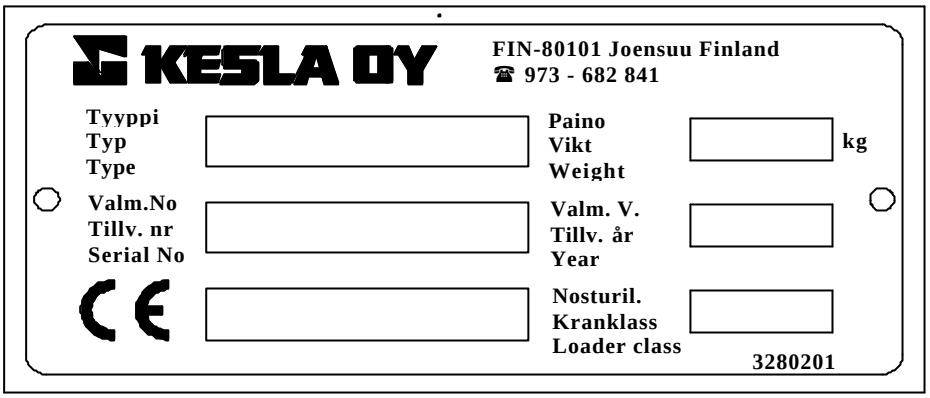
NOTE! *The NOTE! symbol notifies risk of damage for the product, process or environment.*

** The content of the manual has been divided into five larger sections headed at the top of each page. This together with page numbers will make the use of the manual faster and easier.*

** All descriptions, instructions and technical data are based on the latest specification of the machine at the time of the manual. Due to continuos product development, the manufacturer reserves the right to change the product without advance notice .*

** In the case of disturbance in function, the problem and its propable cause can be repaired with the assistance of the fault finding chart. If not, contact the manufacturer or an authorized service centre.*

NOTE! *When ordering spare parts or enquiring for service instructions, always supply the information from the machine plate. This will speed up the process and assure that correct information / parts will be supplied. Copy the information on the machine plate onto the picture below:*


KESLA OY
FIN-80101 Joensuu Finland
☎ 973 - 682 841
Tyyppi
Typ
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Weight
kg
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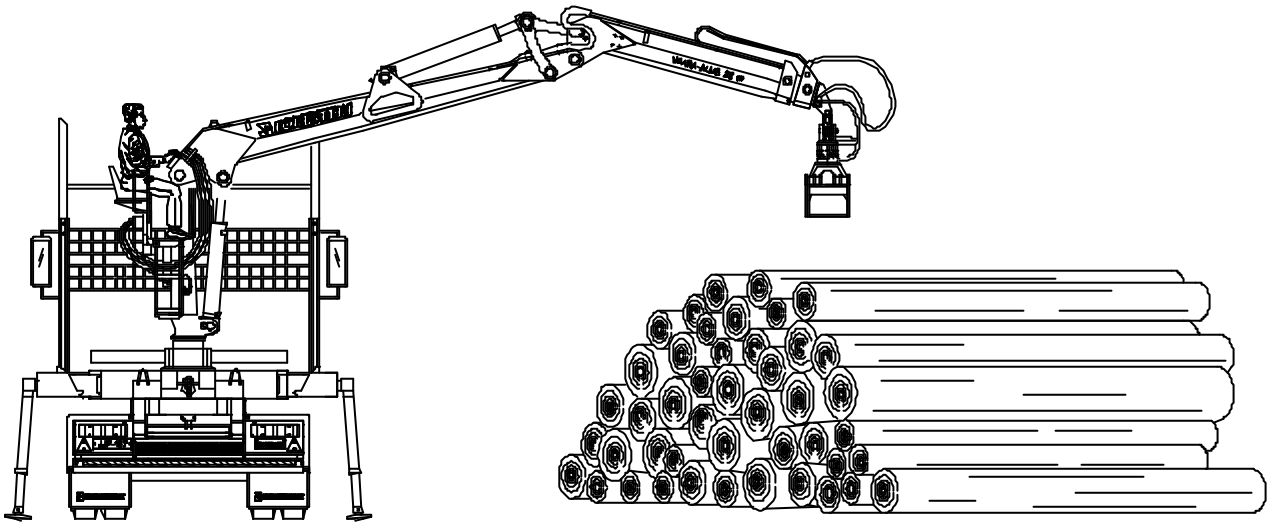
Kranklass
Loader class
3280201

CRANE PRESENTATION

FIELD OF APPLICATION

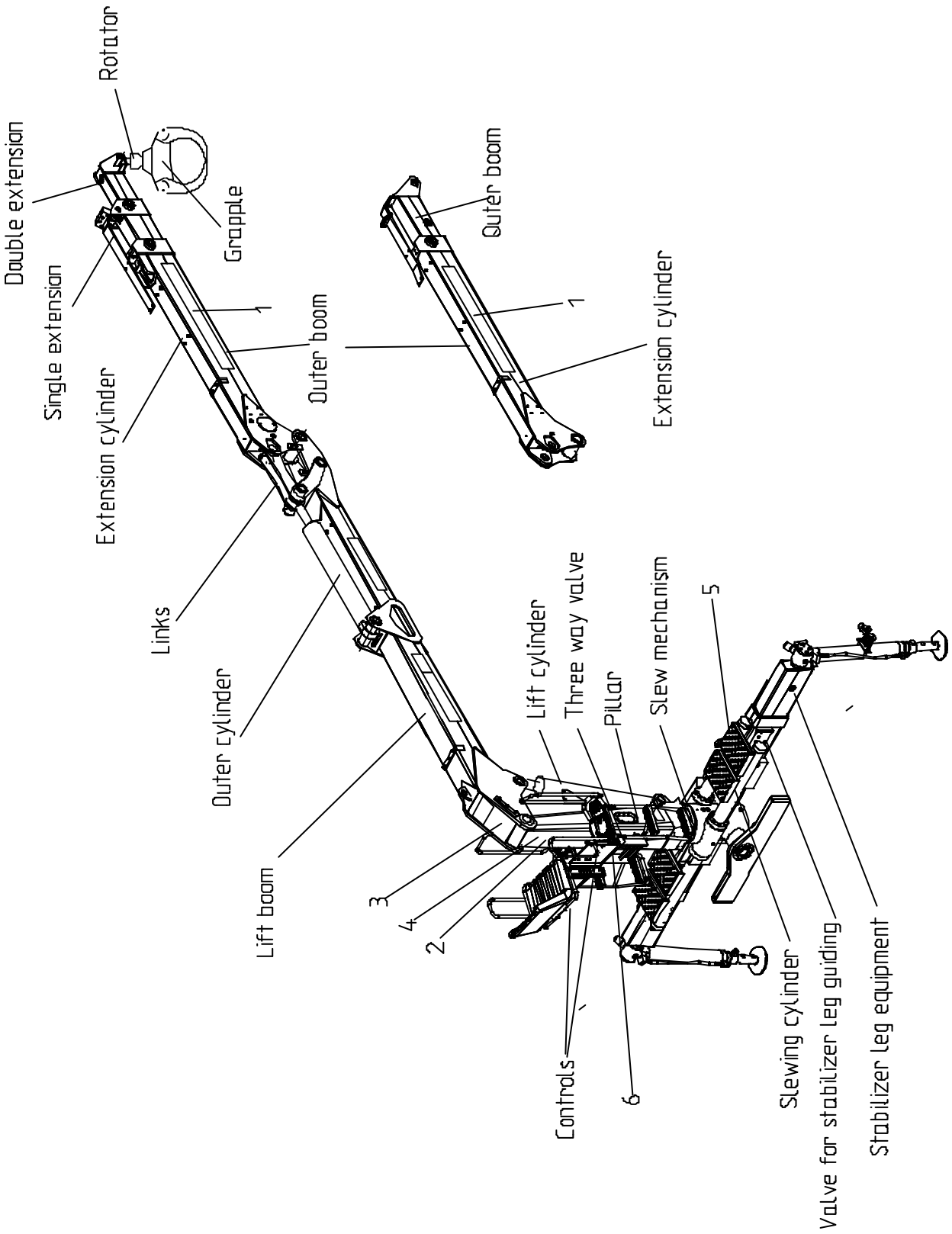
The Foresteri truck crane is designed for professional loading of cut-to-length timber. The crane is also suitable for loading scrap, sand, fertilizers etc, when suitable grapples are used. It is forbidden to use the loader for lifting persons!



OPERATING PRINCIPLE:

To be in working order, the crane needs a power unit with attached hydraulic pump and necessary hydraulic equipment (among others oil reservoir, filters, hydraulic pipes). All working motions are hydraulic. Separate functions (slewing of booms, boom lifting, grapple closing etc.) are achieved by leading pressurized oil with the control valve to the desired hydraulic cylinders. If needed, the operator can drive several functions simultaneously.

MAIN PARTS OF THE CRANE



SAFETY INSTRUCTIONS AT COMMISSIONING

** The Foresteri loader is designed for timber loading and shall be operated only by a person familiar with its use.*

** Get familiar with the crane design, function, controls and user manual before introduction.*

** Do not operate the loader without having read and understood the manual and safety instructions.*

** Follow all instructions and warnings on the loader to avoid unnecessary damage.*

** Ensure the stability of the combination in all circumstances (see the instructions on determining crane stability by calculation).*

** Make sure that the loader is properly fitted (refer to Fitting the loader).*

** Do not start the truck unless the hydraulic pressure to the crane is disengaged.*

** Observe special caution when connecting the crane to and disconnecting the crane from the truck.*
- the ground must be sufficiently strong and even
- turning of the stabiliser leg must be prevented with a locking pin (danger of tipping over) !
- the rear fitting stand must be locked to the truck with a chain

** Always connect the return hose before the supply hoses. Check for proper connection or the control valve may be damaged.*

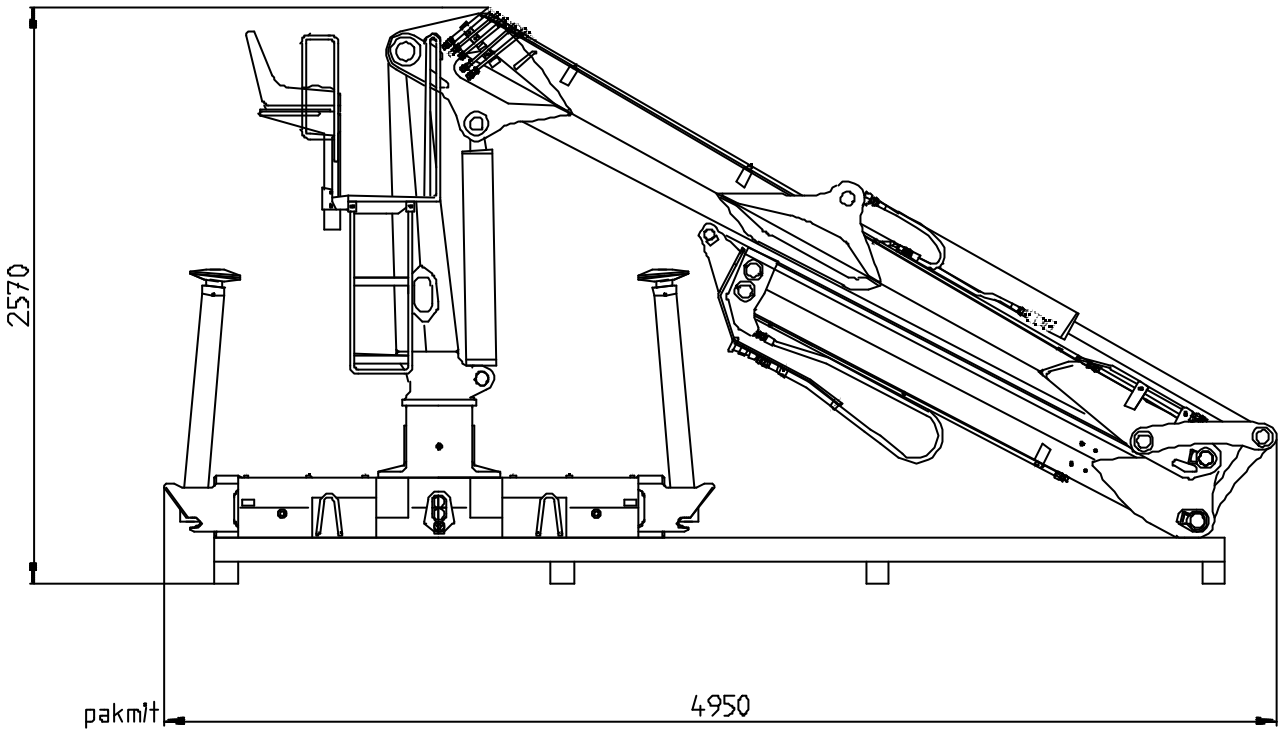
** When connected to the hydraulic system for the first time there may be air in the hydraulic lines, which can cause sudden and uncontrolled movements. Vent the system by driving carefully all cylinders to their limits 4...5 times.*

** Before connecting pressure to the loader check that all control levers of the crane are in middle position and also return there.*

PRELIMINARY PREPARATIONS AT INTRODUCTION

** The Foresteri cranes are delivered from the factory fitted and equipped with operating valves, pressure filters and hydraulic equipment. The rear fitting stand, grapple, slewer etc. are delivered as accessory.*

** The transport base is made of 100x100 timber and can be reused or burned.*



** A lifting capacity of min. 29 kN (3000 kg) is needed for handling the loader. A fork lift can be used for lifting it from under the transport base (NOTE! Danger of tipping over).*

** Do not remove the transport base before the loader is in the place of fitting. Then remove all transport fastenings and bindings.*

** The visible piston rods are protected against corrosion. Remove the protective grease, (using e.g. kerosene), because impurities can damage the seals.*

** Before fitting the crane, the truck has to be fitted with e.g. hydraulic pump/pumps, hydraulic oil reservoir and hydraulic pipes. NOTE! Always check that the hydraulic system of the truck is suitable for the crane.*

PRELIMINARY PREPARATIONS AT INTRODUCTION

Size of the pump must be chosen according to the nominal flow of the control valve (for example 90 l/min for F130CF valve and 120-130 l/min for H170CF valve). Note! oversize pump will create back pressure and overheating of oil. Do not use too high pump flow. Recommended flow rates are available from the control valve manufacturer upon request. Note! The compatibility of the hydraulic system of the truck must be always veified prior to connecting the pressure to the loader.

** The instructions of the vehicle manufacturer/importer must be followed when fitting the fastening muffs of the rear fitting stand and mounting plate (fixed mounting).*

** It is advisable to determine the stability of the combination by calculation. (See instructions for the determination of crane stability by calculation).*

FITTING THE CRANE

Only a service centre or person authorized by the manufacturer is permitted to perform the fitting.

** All crane functions are test loaded by the manufacturer and pressures have been measured. First filling oil: ESSO UNIVIS N 32.*

** The service centre shall affix to the vehicle or crane a machine plate, where following information is given: name and address of service centre, year of mounting, serial number of crane, registration number of the vehicle and CE marking.*

** The crane can be fitted on a movable rear fitting stand or with a fixed installation on a trailer, behind the cabin or at the rear of the truck.*

1. FITTING THE CRANE ON A MOVABLE REAR FITTING STAND

** Fit the truck with fastening muffs (2) to enable the mounting of the stand (3).*
- follow the instructions of the truck manufacturer/importer.

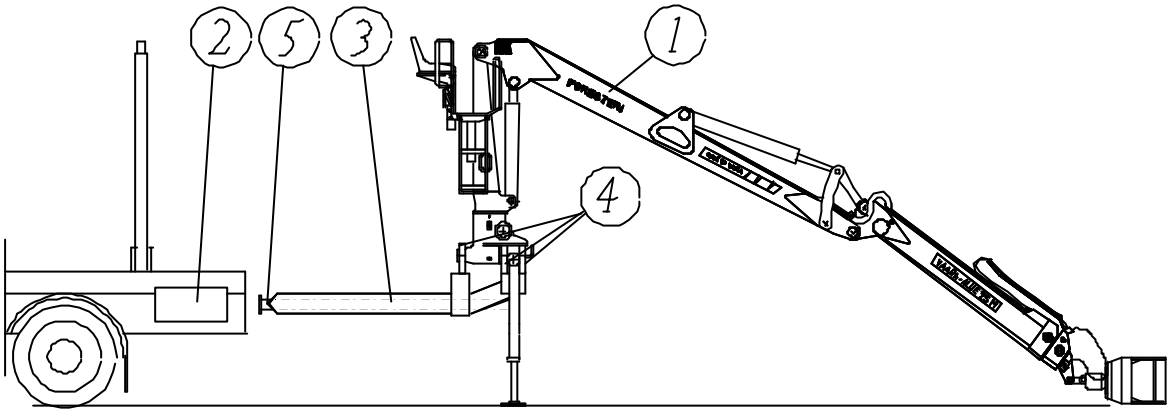
** The fitting stand (3) is lifted into the fastening muffs (2).*

** The stand can be equipped with a moving cylinder (5), in which case the truck is equipped with a suitable mounting set with locking. As an option, the moving cylinder may be mounted on the truck, and the mounting set on the stand.*

FITTING THE CRANE

1. FITTING THE CRANE ON A MOVABLE REAR FITTING STAND

** Lift the crane (1) on the fitting stand (3) and fit six M30 stud bolts (4) into the outer holes of the stand. Tighten the bolts in pairs with a torque wrench to 1200 Nm (122 kpm).*



NOTE! Use a safety chain to prevent the fitting stand from falling down.

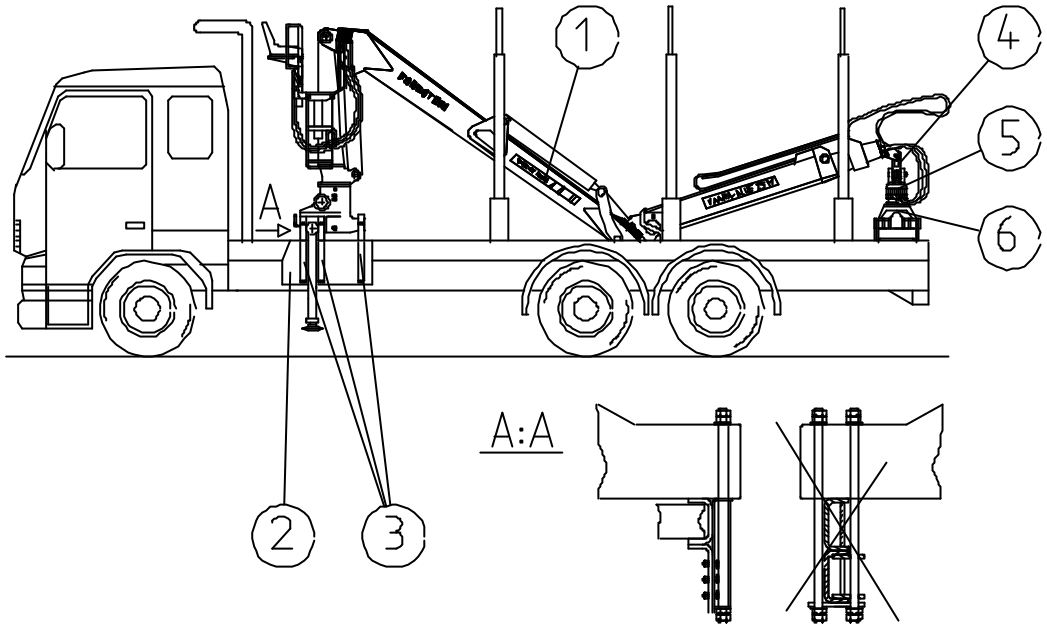
** Connect the return and pressure hoses of the crane to the hydraulic system of the truck. Replace the quick release couplings of the truck, if necessary.*

** The crane can also be fitted at the rear of the truck with a fixed mounting (see paragraph 2).*

NOTE! the start-up inspection shall be carried out at this stage.

FITTING THE CRANE

2. FITTING THE CRANE BEHIND THE CABIN



** Install on the sides of the truck suspension member/frame two PL 10 plates (2),with welded bushings for bolts M30 (3).*
- Follow the fitting instructions of the truck manufacturer/importer.
- Truck manufacturers do not recommend U-bolt connections, which put pressure on the frame beams, or welding directly into the frame.

** Lift the crane (1) on the mounting plates (2). (NOTE! not to be supported by the body beams) and fit the six stud bolts M30 (3) into the bushings. Tighten the stud bolts gradually to 1200 Nm (122 kpm) with a torque wrench.*

** Install the grapple assy: link (4), rotator (5), grapple (6) and the hydraulic hoses, if not factory mounted.*

** Connect the return and pressure hoses to the hydraulic system of the truck.*

NOTE! The start-up inspection shall be carried out at this stage.

INSPECTIONS

Inspector:
The start-up and periodical inspections shall be carried out by a person with sufficient knowledge of loader design, operation and inspection. Please refer to national safety regulations as to the qualifications of the inspector.

Record files:
Record forms for start-up and periodical inspections are supplied with the crane. During every inspection such a form must be filled out and filed with the loader for at least 5 years! Please refer to national safety regulations.

Safety instruction:
The same safety instructions apply to inspections as to normal operation.

1. START-UP INSPECTION

The inspection shall be carried out immediately after mounting, prior to taking the combination into use. The procedure is given in the record of ***start-up inspection*** *(enclosure 1) including the determination of stability of the combination according to Finnish standard SFS 4677 and operational test according to Finnish standard SFS 4261.*

2. AFTER-SALES SERVICE

An authorized service centre shall carry out the procedure given in the ***after-sales service*** *record (enclosure 2). The continuation of a full warranty requires that this overhaul is done within 30 days from the installation of the crane.*

3. PERIODICAL INSPECTION

An operating loader must be inspected within a period of one year and also test run according to standard SFS 4261 every four years (Please refer to national regulations as they may rule differently). The inspection procedure is given in the records for ***periodical inspection*** *(enclosure 3). During the inspection special attention must be payed to fatigue of material, wear, corrosion and other damage caused by operation. No structural changes are allowed especially from the safety point of view.*

4. DAILY OVERHAUL PRIOR TO OPERATION

** Check the oil quantity of the hydraulic system and the slew mechanism and add, if needed.*
** Lubricate the crane, if necessary (refer to Maintenance procedures).*
** Make a visual inspection of the loader's fitting screws, pin lockings, hoses and any possible leakage.*
** Check the function of controls and the safety equipment by driving the functions to their limits and repair possible faults and defects immediately.*
** Ensure that the EMERGENCY STOP button works.*

INSTRUCTIONS FOR THE DETERMINATION OF CRANE STABILITY BY CALCULATION

** Crane stability is determined at the start-up inspection by e.g. an authorized installation firm or installer.*

NOTE! Determination by calculation is not required, if crane stability is determined by test. Determination by test is necessary also, if calculated stability is < 1.0

The formulas and the example given are based on the Finnish standard SFS 4677. Quotations with permission of SFS.

** The crane is considered stable when the sum of tilting moments multiplied by the stability factor is smaller than the sum of sustaining moments.*

** The crane is under static load on a horizontal surface in the most unfavourable direction regarding the tipping line. The vehicle is without load.*

** The stability factor with a crane fitted behind the cabin must be n ³ 1,4, and with a crane installed at the rear n ³ 1,0. If the calculated factor is n < 1, stability must be determined by test.*

** If the factor is n = 0,75...1,0, 25 % of the permissible working load can be taken into account in stability calculation of a crane fitted at the rear of a truck. This load must be added to the axle / multiple-axle load. In this case there must be halved load values in the load plate, and the text: vehicle without load or with <25% load.*

** The following points are used as points of vertical intersection of the tipping lines: Support points of stabiliser legs, wheel centres, midpoint of a pair of wheels, midpoint of front axle of a crane fitted at the rear of a truck.*

** It is not possible to know beforehand all the factors needed in and affecting the calculation of crane stability. Crane stability must therefore be determined separately in each case, depending on the make of the vehicle, vehicle construction, crane type and place of installation, on the basis of actual (measured or calculated) measurements and weights.*

** If you have any problems or questions regarding the determination of crane stability, and can not find answers in the vehicle service manual/registration book, please contact the nearest dealer or importer of the vehicle. Regarding the*

rear fitting stand, please contact its manufacturer, and regarding the crane, Kesla Oyj.

INSTRUCTIONS FOR THE DETERMINATION OF CRANE STABILITY BY CALCULATION

Formula (general formula for all installation alternatives)

$$\frac{M_1 \cdot D + N \cdot A + M_2 \cdot C + M_3 \cdot C' \ ^3 \ n}{G \cdot B + P \cdot E}$$

Content of the formula:

A = perpendicular distance between the crane tipping centre and the tipping line
- measured or calculated

B = perpendicular distance between the end of the boom (load) and the tipping line
- measured or calculated

C = perpendicular distance between the centre of the rear axle and the tipping line
- measured or calculated (measurements from the vehicle)

C' = perpendicular distance between the centre of the rearmost front axle and the tipping line of the vehicle (4 axles)
- measured or calculated (measurements from the vehicle)

D = perpendicular distance between the centre of the front axle and the tipping line of the vehicle
- measured or calculated (measurements from the vehicle)

E = Perpendicular distance betwe en the crane booms centre of gravity and the tipping line
- measured or calculated

G = Maximum load with maximum reach
- on the load plate

N = crane mass without booms (+ possible fitting stand)
- from the crane manufacturer

P = weight of booms (in the centre of gravity)
- from the crane manufacturer

M_1 = front axle weight without load
- from the vehicle

M_2 = rear-axle weight without load
- from the vehicle

M_3 = weight of the rearmost front axle without load (4-axle vehicle)
- from the vehicle

n = stability factor

a = angle between the vehicle centre axis and tipping line
- calculated on the basis of measured values

On the following pages you will find formulas for different crane/vehicle combinations.

INSTRUCTIONS FOR THE DETERMINATION OF CRANE STABILITY BY CALCULATION

***1**. Vehicle with 2 or 3 axles, with crane behind the cabin.*

- stability factor must be (according to SFS 4677) ³ 1,4

- crane stability is calculated with the following formula:

$$\frac{M_1 \cdot D + N \cdot A + M_2 \cdot C}{G \cdot B + P \cdot E}$$

- if result is ³ 1,4 , the machine is considered stable

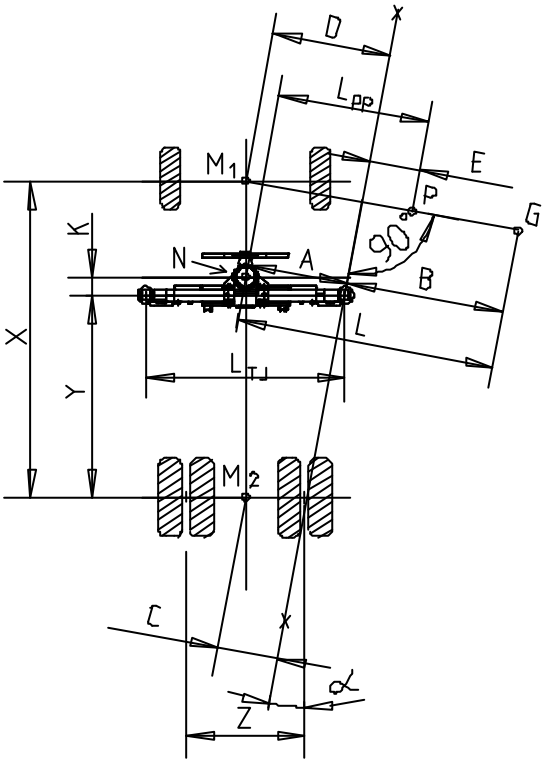


FIGURE 1

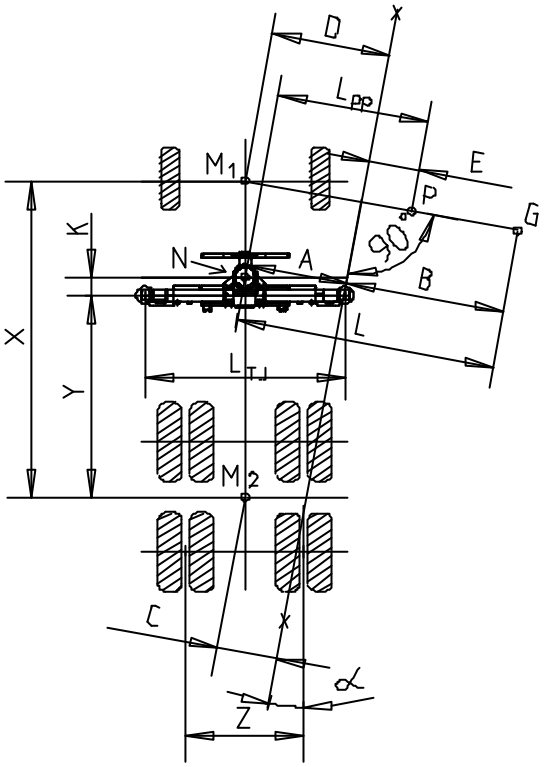


FIGURE 2

INSTRUCTIONS FOR THE DETERMINATION OF CRANE STABILITY BY CALCULATION

1. *CRANE INSTALLED BEHIND THE DRIVER'S CABIN (figures 1 and 2)*

Information from the vehicle:

M_1 *= front axle weight without load* ..... _____ *kg*
M_2 *= rear axle weight without load* ..... _____ *kg*
X = wheel base ..... _____ *mm*
Y = distance between rear axle and crane stabiliser legs ..... _____ *mm*
Z = distance between rear wheel centres (wheel track)

Manufacturer's information on the Foresteri crane:

N = crane weight without booms ..... _____ *kg*
P = weight of the booms ..... _____ *kg*
G = load with maximum reach ..... _____ *kg*
L = maximum reach from the tipping centre ..... _____ *mm*
L_{PP} *= distance of the booms centre of gravity from the tipping centre* ..... _____ *mm*
L_{TJ} *= support width of the stabiliser legs form the tipping centre* ..... _____ *mm*
K = distance of the tipping centre from the stabiliser legs ..... _____ *mm*

The above information is used to calculate angle α*. (angle between the vehicle centre axis and the tipping line), as well as the factors A, B, C, D and E. Use a function calculator in the calculation.*

$$a = \arctan \frac{L_{TJ} - Z}{2 \cdot Y} = \text{.....} \quad \text{_____}^\circ$$

$$A = K \cdot \sin \alpha + \frac{L_{TJ}}{2} \cdot \cos \alpha = \text{.....} \quad \text{_____ mm}$$

$$B = L - A = \text{.....} \quad \text{_____ mm}$$

$$C = \frac{Z}{2} \cdot \cos \alpha = \text{.....} \quad \text{_____ mm}$$

$$D = X \cdot \sin \alpha + \frac{Z}{2} \cdot \cos \alpha = \text{.....} \quad \text{_____ mm}$$

$$E = L_{PP} - A = \text{.....} \quad \text{_____ mm}$$

The solved numerical values shall be placed in the following formula:

$$\frac{M_1 \cdot D + N \cdot A + M_2 \cdot C}{G \cdot B + P \cdot E} = \text{.....} \quad \text{_____}$$

The machine is considered stable, if the result is ³ 1,4

INSTRUCTIONS FOR THE DETERMINATION OF CRANE STABILITY BY CALCULATION

2. *Vehicle with 2, 3 or 4 axles with the crane fitted at the rear. (D=0)*

- stability factor must be (according to SFS 4677) n ³ 1,0

- stability factor is calculated with the following formula:

$$\frac{N \cdot A + M_2 \cdot C + M_3 \cdot C'}{G \cdot B + P \cdot E}$$

- if the result is ³ 1,0, the machine is considered stable

- if the result is 0,75...1,0, stability must be determined by test

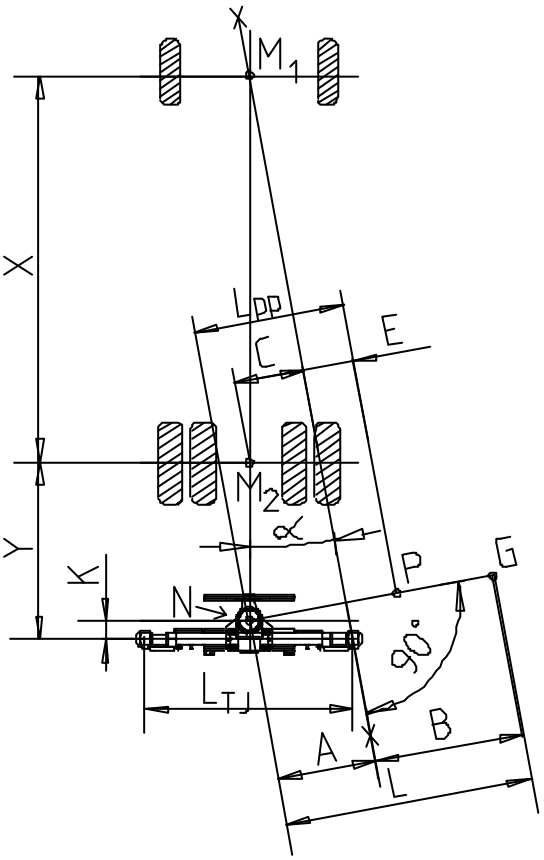


FIGURE 3

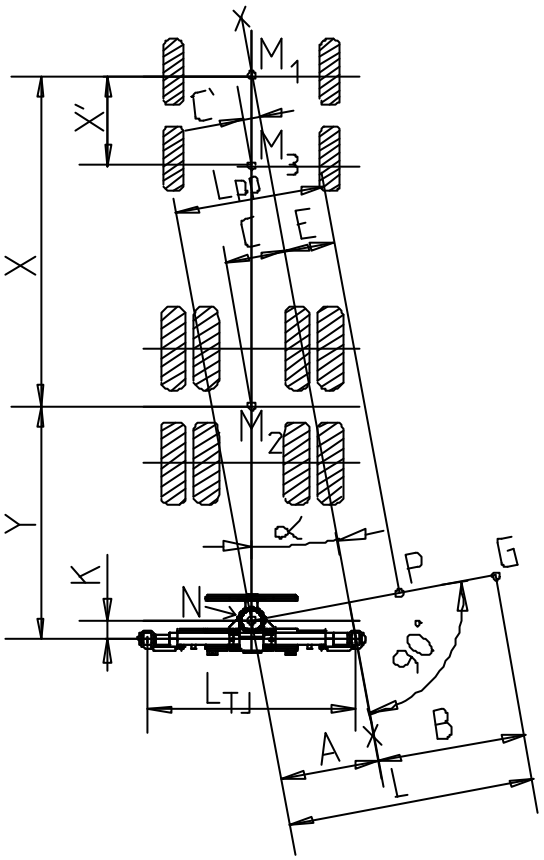


FIGURE 4

INSTRUCTIONS FOR THE DETERMINATION OF CRANE STABILITY BY CALCULATION

2. CRANE INSTALLED AT THE REAR OF A TRUCK (figures 3 and 4)

Information from the vehicle for calculation:

M_2 = rear axle weight without load ..... _____kg
M_3 = rearmost front axle weight without load ..... _____kg
(M_3 = 0, if there is no such axle)
X = wheel base..... _____mm
X' = front wheel base..... _____mm
Y = distance between rear axle and crane stabiliser legs..... _____mm

Manufacturer's information on the Foresteri crane:

N = crane weight without booms..... _____kg
P = weight of the booms..... _____kg
G = load with maximum reach..... _____kg
L = maximum reach from the tipping centre ..... _____mm
L_{PP} = distance of the booms centre of gravity from the tipping centre. _____mm
L_{TJ} = support width of the stabiliser legs ..... _____mm
K = distance of the tipping centre from the stabiliser legs ..... _____mm

The above information is used to calculate angle α *(angle between the vehicle centre axis and the tipping line), as well as the factors A, B, C, C' and E. Use a function calculator in the calculation.*

$\alpha = \arctan \frac{0{,}5 \cdot L_{TJ}}{X + Y}$ = ... _____ °

$A = (X + Y - K) \cdot \sin \alpha$ =..... _____mm

$B = L - A$ =..... _____mm

$C = X \cdot \sin \alpha$ =..... _____mm

$C' = X' \cdot \sin \alpha$ =..... _____mm

$E = L_{PP} - A$ =..... _____mm

The solved numerical values shall be placed in the following formula: $\frac{N \cdot A + M2 \cdot C + M3 \cdot C'}{G \cdot B + P \cdot E} =$

If the result is 0,75...1,0, the machine is considered stable.

Installation firm _____

Date. _____ *Signature* _____

INSTRUCTIONS FOR THE DETERMINATION OF CRANE STABILITY BY CALCULATION
CALCULATION EXAMPLES F2008T

FORESTERI 2008T crane installed at the rear of a three-axle truck on a fitting stand:

M_2 = 6500 kg — *multiple-axle weight without load*

X = 5500 mm — *distance between bogie and front axle*

Y = 3300 mm — *distance of the stabiliser legs from the centre of the stand*

Manufacturer's information on the Foresteri 2008T crane:

N = 1140 kg — *crane weight without booms*

P = 710 kg — *weight of the booms*

G = 847 kg — *load with maximum reach*

L = 9650 mm — *maximum reach from the tipping centre*

L_{PP} = 3693 — *distance of the booms centre of gravity from the tipping centre*

L_{TJ} = 3550 mm — *support width of the stabiliser legs*

K = 236 mm — *distance of the tipping centre from the stabiliser legs*

$$n = \frac{N \cdot A + M_2 \cdot C + M_3 \cdot C'}{G \cdot B + P \cdot E} \quad \text{formula..... } (M_3 = 0)$$

$$\alpha = \arctan \frac{0{,}5 \cdot L_{TJ}}{X + Y} = \arctan \frac{0{,}5 \cdot 3550}{5500 + 3300} = \ldots 11{,}4°$$

$A = (X+Y-K) \cdot \sin \alpha$
$= (5500+3300 - 236) \cdot \sin 11{,}4° = \ldots\ldots 1693$ mm

$B = L - A = 9650 - 1693 = \ldots\ldots 7957$ mm

$C = X \cdot \sin \alpha = 5500 \cdot \sin 11{,}4° = \ldots\ldots 1087$ mm

$E = L_{PP} - A = 3693 - 1693 = \ldots\ldots 2000$ mm

$$n = \frac{1140 \cdot 1693 + 6500 \cdot 1088}{847 \cdot 7957 + 710 \cdot 2000} = \ldots\ldots 1.10$$

n > 1.0 , machine is considered stable

INSTRUCTIONS FOR THE DETERMINATION OF CRANE STABILITY BY TEST

SAFETY INSTRUCTION

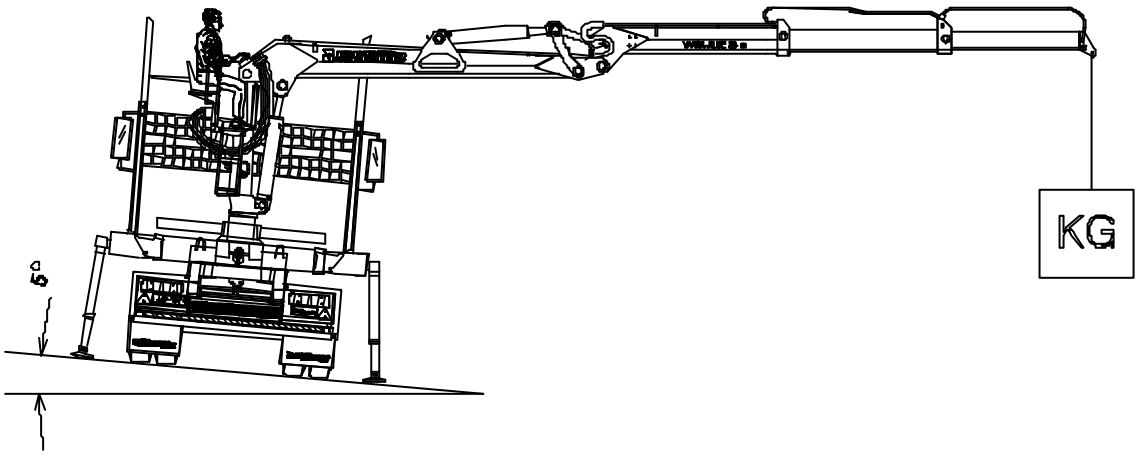
** Follow extreme caution when proceeding with the test. Danger of tipping over!*
** Make sure before the test that air has been removed from the entire hydraulic system. Uncontrolled movements!*
** Make sure that the ground is firm enough to withstand the loads of the wheels and other support points.*

TEST CONDITIONS

** During the test the vehicle shall be in normal running order without load.*
** Remove possible grapple assy or weigh it as part of the test load according to the table.*
** Incline the vehicle 5° in the direction of the tipping line during the test.*

PERFORMING THE TEST

** Carry out the test with the most unfavourable reach in regard to the stability and using an overload of 10 % .*
** Drive all crane movements as normally driven. Observe extreme caution during the test!*



** The machine is considered stable, if no more than one of the machine fulcrum points looses its hold from the ground during the test.*
** If more than one support point looses its hold, put a load of 25 % of the max. permissible load in the load area and repeat the test.*
** In such a case add in the load plate halved load values and the text: vehicle without load or with load < 25 % .*
** Stability determined by the installation firm:*

Installation firm _____

Date _____ *Signature* _____

OPERATING AND SAFETY INSTRUCTIONS

Do not let an operator who has not become familiar with the operating and safety instructions operate the loader!

** Always have the parking brake engaged when loading. Place parking blocks in front of and behind the wheels, if necessary.*

** Ensure that the rear fitting stand is locked with a chain to the vehicle.*

** Feed oil with a three-way valve, when needed, to the control valve of the crane or the valve operating the stabiliser legs. The stabiliser legs are operated by a valve fixed to the base or by remote control from the point of operating.*

** Spread the stabiliser legs as wide as possible to ensure good stability. If this is not possible, start the loading with minor loads.*

** Ensure that the ground under the stabiliser legs is firm enough. Use additional plates, if necessary.*

** The stabiliser legs are equipped with pressure controlled return valves and therefore they will hold in case of overloading or hose damage. The turning of the stabiliser legs can be prevented with a locking pin. (E.g. a crane installed on a stand is disconnected from the truck to stand on its stabiliser legs.) When the crane is in operation, the locking pin is usually not needed.*

** Note that when increasing the load, most of the weight will be on the stabiliser legs, as the truck springs have been disengaged by the stabiliser legs. Therefore it is recommended to shorten the stabiliser legs in the middle of the loading process in order to move the weight onto the truck wheels.*

** Avoid loading on sloping ground. However, if it is necessary to load on sloping ground, follow extreme caution and lift only smaller loads. When loading from the upper side of the machine, remember that the relief valve of the slewing cylinders can be overloaded causing the load to escape in the down hill direction and leading to a dangerous situation.*

** The stability of the machine unit is at its weakest, when the load area is empty. If the machine starts to tip over, lower the load immediately to the ground. Do not drop the load by opening the grapple.*

** Ensure that the work area is clear of persons and that you have an unobstructed view over the whole area.*

** Never lift the load above people.*

OPERATING AND SAFETY INSTRUCTIONS

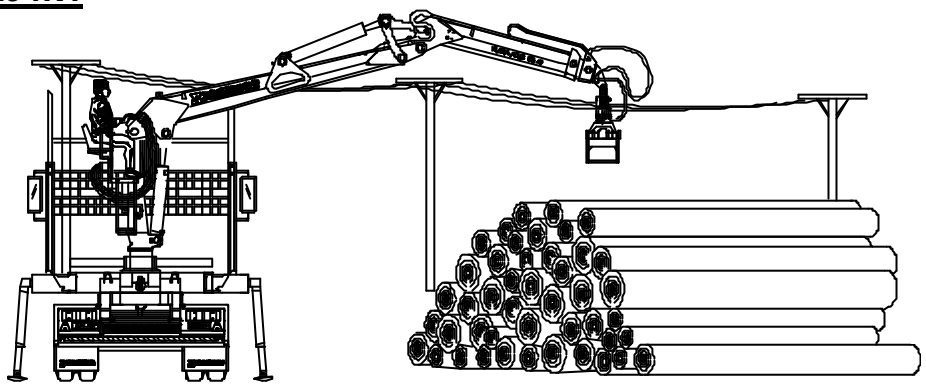
** Take a firm grip of the load and always as close to the centre of gravity as possible. Do not exceed the max. loads given in the safe working load table.*

** Do not try to lift with the telescopic extension out. Instead pull the extension in and then lift.*

** Avoid quick lifting and lowering movements with the booms in max. reach, also swinging movements before the load is in the air.*

** Never drive the booms to their limits with great speed.*

** Follow extreme caution when working close to live electrical conductors. Make the safety distances to such conductors clear to yourself and follow them. (Refer to WARNING decal).* ***Minimum safe approach distance to electrical conductors 5 m, if voltage > 110 kV.***



** Never leave the boom hanging above the ground if you leave operator's seat!*

** When you have finished loading, lower the crane firmly against the base machine and turn off the pump before driving off.*

** Follow extreme caution when connecting the crane to and disconnecting the crane from the vehicle. Danger of tipping over!*
- Prevent the turning of the stabiliser legs with a locking pin.
- Support the booms carefully to the ground.
- The ground has to be firm and even.
- Ensure that there are no unauthorized persons on danger zone.

** No additional extensions shall be mounted without the manufacturer's permission.*

** Never use a faulty crane.*

** Never use the crane for towing.*

** Never use the crane for lifting people.*

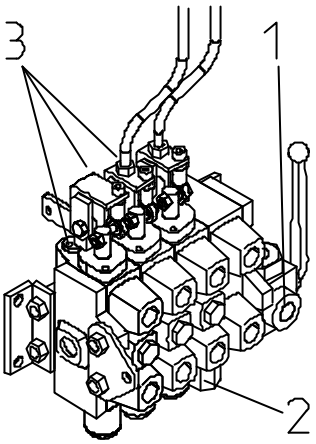
SAFETY EQUIPMENT

** For safety at work the crane's hydraulic system is fitted with various relief valves.*

** Never alter the valve settings without the manufacturer's written permission. The manufacturer will not be responsible for any damage if the settings have been altered without permission.*

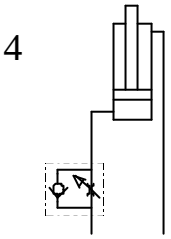
** The pump circuits of the truck hydraulic system have to be equipped with relief valves with relief pressure at least twenty (20) bar higher than that of the main relief valve of the crane.*

1. The three-way safety valve is located at the pressure section of the right-hand control valve. It is used to feed pressurized oil either to the control valve or stabiliser leg valve, thus preventing unintentional use of the stabiliser leg valve during loading.

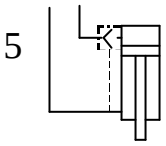


2. Each control valve has at its pressure section a main relief valve, which prevents the working pressure from rising too high. If the oil coming into the control valve has a pressure higher than the set pressure, oil will flow out to the reservoir channel until the set pressure has been reached.

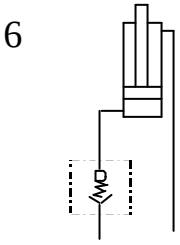
3. Relief valves stop the pressure from rising too high in different cylinders. If the load on the cylinder exceeds the pressure setting, oil will flow from the cylinder via the relief valve until the permitted pressure is reached.



4. The check valves with adjustable restriction are located in the main lifting and outer cylinders. The maximum lowering speed of the booms is adjusted with these valves so that the speed is suitable and that there is enough oil coming from the pumps to these cylinders.



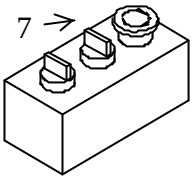
5. The stabiliser legs are fitted with pressure controlled return valves, which prevent the stabiliser leg from collapsing in case of overloading or hose damage.



6. The main lifting boom, outer boom and boom extension cylinders can be fitted with a hose burst valve, which will lock the oil into the cylinder if the flow speed becomes too high e.g. in case of a hose burst. The hose burst valve will open, when oil is directed through it in the opposite direction.

7. The crane control system shall be fitted with an EMERGENCY STOP button located at the point of operation. It is used either for cutting the oil flow to the crane (with e.g. an el.

controlled valve) or alternatively the current to the control valve with indirect pilot operation. The button may be used also for stopping the power engine, if this can be done from operator's seat.



CRANE OPERATION

The operator of the loader must have read and understood the manual and the safety instructions before operating the loader.

GENERAL

Good knowledge of the features as well as sound practical experience are the conditions for safe and effective use. Every crane model has different geometry and speeds of movement and therefore even an experienced operator should thoroughly familiarize himself with the characteristics of a new crane.

TRAINING

An experienced operator drives many crane movements simultaneously, adjusting different speed of movements to his liking. Naturally, the speed of the crane movements will decrease when the same oil flow is directed to many cylinders. Soft and effective work is achieved with soft and easy lever handling avoiding jerky movements and sudden stops, this way working is safe and effective and unnecessary repairs will be avoided. It is recommended for an unexperienced operator to adjust the pump flow to be low, in which case it is easier to avoid sudden movements. Smaller loads are also recommended when getting familiar with the crane.

COMMISSIONING

** Refer to Safety instructions at commissioning*

** Ensure that the hydraulic system of the vehicle is cleaned before connecting the hoses to the crane.*

** The crane's hydraulic system is cleaned and tested by the manufacturer.*

** Final inspection according to SFS 4261 has been carried out by the manufacturer.*

** Check that the hydraulic oil reservoir is filled up, inlet line from tank to pump is open and that the pressure and return filters are installed.*

** Always start with cleaning the quick couplings first. Connect the return hose before pressure hoses. Check for secure connection of quick couplings. If the return hose is not properly connected, the control valve will be damaged.*

** When starting the truck, hydraulic pressure shall not be connected to the crane.*

CRANE OPERATION

COMMISSIONING

** Check that the crane levers are in middle position and that they also return to the middle position.*

** Refer to Daily overhaul prior to operation.*

CRANE OPERATION

** Start the pump and set its flow to about 70 - 90 l/min (one-circuit pump) or 2 x 60 - 80 l/min (two-circuit pump). If necessary, consult the pump manufacturer for the flow settings corresponding to different operating speeds.*

** At low temperatures start the work by letting the oil circulate freely for a while through the valves with a small flow. Then carry out all working motions slowly back and forth, so that the seals will limber up before they have full pressure. The lowest recommended working temperature for the crane is -25° C. The crane can be used even at a temperature of -35° C, if this is tolerated by the hydraulic system of the base machine.*

** Notice that the hydraulic seals wear sooner, hoses are more likely sustain damage and the steel constructions are more exposed to brittle fracture at low temperatures. At working temperatures below -25° C it is more favourable to lift smaller loads than normally, to avoid unnecessary damage.*

** Equally, in very warm conditions, make sure that the hydraulic oil does not overheat (< 70 ° C). An oil temperature too high can damage the seals and furthermore shorten the operating life of the oil.*

** Use stabiliser legs to set the crane pillar in an utmost upright position.*

** Observe the positions, where the loader or the load can hit the cab or other parts of the truck.*

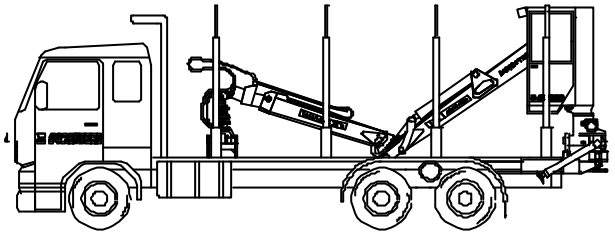
** Stop the loader working immediately, if there is any risk of danger.*

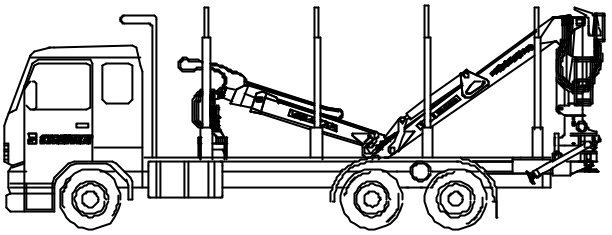
** Always make sure you have sufficient working light.*

TRAFFIC ON PUBLIC ROADS

** Comply with all the statutes and decrees of the Road Traffic Law when driving on public roads.*

** If the load area is empty, lower the main lifting boom end on the bolster and the closed grapple against the frame.*



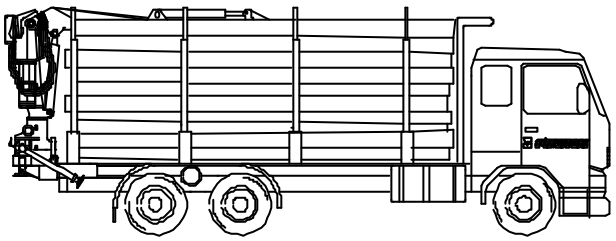


** When the load is full, leave an empty space where the boom can fit along the centre on top of the load to avoid any part of the crane to rise above the permitted transport hight.*

** Pull the stabiliser legs and their widenings to transport position and lock them.*

** For the time of driving, disengage the hydraulic pump.*

· *Secure the load carefully with load lines.*



** The removable rear fitting stand has to be locked mechanically with a chain to the frame of the truck.*

** Do not exceed the allowed axle or total weight or transport dimensions.*

** Before driving off, check the lights, reflectors, tyre pressure, trailer connection etc.*

** Adjust the travelling speed to the situation. Make sure you have full machine control at all times.*

** Observe the combination height when driving under live electrical conductors, telephone lines and bridges.*

SAFETY INSTRUCTIONS WHILE SERVICING

Start by becoming familiar with the service instructions, faulty or inadequate service might damage the crane.

** NOTE ! Never use a pressure washer when washing the electric components.*

** Dismounting of the crane or its components during the guarantee period must be done by a service company or person authorized by the manufacturer.*

** When servicing, repairing or cleaning, support the boom against the frame! Never leave the boom supported by the hydraulic cylinder only!*

** Disconnect the pump and turn off the engine, if the crane is not to be used during service.*

** Never try to open, tighten etc. a pressurized hydraulic system.*

** Entry of air into the opened hydraulic system can cause sudden, unanticipated movements when retaking the crane in use.*

** When handling the loader or its component use lifting equipment with sufficient capacity. Never stand under the load when working or lifting.*

** Avoid skin contact with oil or grease during work or service. They contain solvents and additives that can be harmful in repeated skin contact (dry and cracked skin). Old and dirty oils and greases are more harmful than new ones. Follow the instructions of the manufacturer and authorities when handling these substances.*

** If oil or grease have caused rash or inflammation, or they have got into the eyes, immediately contact a physician.*

** Wear gloves, protective skin cream, eye protectors and proper protective clothing when handling oils and greases.*

** Never wear oily or greasy clothes and never keep oily tools or other oily objects in your pockets.*

** Never clean your hands with oils or greases.*

** Waste oil from service and repairs shall always be sent to a plant, where it can be duly treated.*

HYDRAULIC OILS

Choose an oil suited for the hydraulic system of the crane and handle and service it correctly.

1. HYDRAULIC SYSTEM

** To function, the crane needs a hydraulic system, consisting of a power unit, pump, oil reservoir, filters and other hydraulic equipment needed.*

** The oil in the hydraulic system works both as a power transmitter and a lubricant.*

** A high-class oil is the first conditon for the undisturbed function of the crane.*

** Connect the crane to an absolutely clean hydraulic system, equipped with a pressure and return filter.*

** The system must also have a breather filter, which prevents the entry of larger impurities into the hydraulic system. Despite the breather filter, small foreign particles enter the oil reservoir with the air sucked into it.*

** Foreign particles can cause damage in the long run, as the pump and valves work with minimum clearences.*

** Due to temperature changes, water may be condensed in the hydraulic system. Especially in winter time the water may cause disturbances. Therefore change the oil regularly, according to service recommendations or at least twice a year; in the spring and in the fall.*

** Change new filters regularly, according to service recommendations and always when changing oil.*

** Wash the oil reservoir with kerosene or white spirit (not with fuel oil).*

2. THE CONDITIONS FOR A GOOD HYDRAULIC OIL

** Solidification temperature below -50°C.*

** The viscosity may not drop below 1.5 E°, +50°C, in piston pumps and 2.5 E°, +50°C, in gear pumps.*

HYDRAULIC OILS

** The hydraulic oil must contain required additives in regard to the lubrication ability, anticorrosion and foam prevention.*

** The oil shall be suited for the seal materials of the crane. (Never use motor oil in the hydraulic system.)*

** Even a new hydralic oil contains impurities which, due to their size, can cause disturbances.*

3. IMPURITIES IN OIL

** Storage and transport vessels accumalate dirt.*

** Due to wear in operation, a crane creates metal and other foreign particles, which enter the hydraulic system.*

** During crane repair dirt gets into the system.*

** In case of component damage greater quantities of impurities can get into the circulation at one time.*

** Impurities in oil can lead to a faster than normal component wear, temporary malfunctions, e.g. clogging up oil channels or jamming valve spools, and worst of all, component damage.*

4. AVOID ENTRY OF IMPURITIES INTO THE OIL

** Do not store the oil vessels outdoors - risk of water condensing in the oil.*

** Store the oil in the original closed vessels. Pump or pour the oil directly from the barrel into the tank.*

** Use clean vessels when handling the oil. Make sure that the plugs, funnels, sieves and filling holes are clean.*

HYDRAULIC OILS

** Clean the place to be repaired and the surroundings prior to work. Make sure that no grinding or welding work is done close by when the hydraulic system is opened. Keep the working place, hands and tools clean. Use correct tools.*

** Avoid repairing the hydraulic system outdoors or in dusty conditions.*

** Try to locate the area where the fault is as well as possible, to avoid opening the system too much.*

** Make sure that the dismantled parts and the place of repair are well covered.*

** Do not open the spare parts packages before the moment of installation.*

** Clean filters and replace filter cartridges according to service instructions.*

** Prior to installation, blow the hydraulic hoses and pipes with air and wash them, when necessary. Wash the parts with kerosene or white spirit.*

** Always use high-class oils with correct viscosity produced by well-known manufacturers.*

Secure reliable crane function and avoid unnecessary malfunctions by following the service instructions and keeping things clean during hydraulic installations!

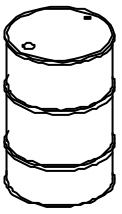
5. BIODEGRADABLE HYDRAULIC OILS

** Instead of normal hydraulic oils, oils that dissolve quicker in the environment have been developed to minimise the damage in case of oil leakage. Many forestry companies require the use ot these oils in their machines.*

** Normal oils cannot directly be replaced with any biodegradable oil without changing the hydraulic components (e.g. pump seals, hoses).*

** Biodegradable oils are divided into three main classes:*

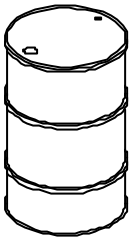
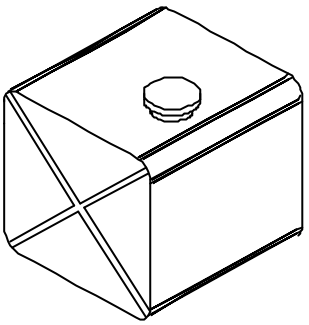
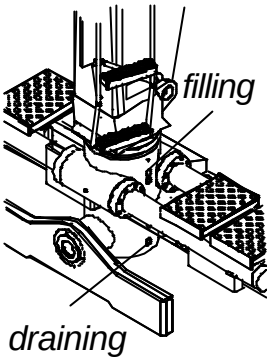
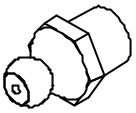
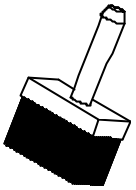
1. *Hydraulic oils based on vegetable oils (HETG) e.g. rape oils*
2. *Synthetic hydraulic oils based on polyglycols (HEPG)*
3. *Synthetic hydraulic oils based on esters (HEE)*



** NOTE! Before using a biodegradable hydraulic oil, consult your oil dealer when choosing a suitable oil type and clarify its suitability for the pump seals and other hydraulic components.*

OILS AND LUBRICANTS

The table below shows some hydraulic oils, lubricants and greases suited for the crane.

Oil brand	Hydraulic system		Slew mechanism	Grease nipples
	 summer winter			 Sliding surfaces Chain 
ESSO	UNIVIS N 46	UNIVIS N 32,22	GEAR OIL GX 80W/90	MULTIPURPOSE GR MOLY
MOBIL	DTE 16	DTE 15,13	MOBILUDE HD 80W-90	MOBILUX EP 2, MOBIL GREASE MP, SPECIAL
SHELL	TELLUS OIL T 46	TELLUS OIL T 32,22	SPIRAX HD 80W/90	ALVANIA EP GREASE 2
TEBOIL	HYDRAULI OIL 46	HYDRAULI OIL 32,22	HYPOID 80W/90	MULTIPURPOSE EP, MDS
NESTE	HYDRAULI 46	MULTIHYDR AULI 22, SUPER 32	HYPOIDI MP 80W/90	MP GREASE, MOLYGREASE

** When starting the machine follow the pump manufacturer's instructions for cold start.*

** If the oil temperature does not rise above 70° C in summer, winter oil can be used all year round.*

** The manufacturer has filled the crane with oil ESSO UNIVIS N 32.*

** Foremost follow the recommendations of the base machine manufacturer or the supplier of the hydraulic system, when choosing hydraulic oil.*

** The oil capacity of the crane is about 50 l. depending on the size, and therefore at the oil change a large amount of the oil will remain in the hydraulic system. Therefore pay special attention to the compatibility of the remaining and the new oil.*

TENSIONING TORQUES
Foresteri 2008, 2008T

Description	*Partnumber*	*Bolt / thread*	*Nm (kpm)*
Fitting of crane *Fitting of slew mechanism*	*9001 3950* *9001 3836*	*M 30* *M 30*	*1200 (122)*
Slewing cylinder *Piston nut*	*301 0601* *302 0026*	*M14x60, 12.9* *M24, NYLOC**	*200 (20)* *700 (71)*
Lifting cylinder mouth piece *Piston*	*2839 7202* *2839 7201*	*M129.5 x 2* *M50x2*	*** *1200 (122)*
Outer cylinder mouth piece *Piston*	*2839 7202, 2847 7202* *2839 7201*	*M129.5 x 2* *M50x2*	*** *1200 (122)*
Boom extension cyl., single ext., mouth piece *Piston nut*	*2824 6202, 2820 1202* *302 0008 / 302 0009*	*M64x2* *M20/UNF1”* *nyloc**	*** *700 (71)*
Boom extension cyl., double ext., mouth piece *Piston nut*	*2831 1202* *302 0041*	*M70x2* *M30x2, nyloc**	*** *700 (71)*
Stabiliser leg cyl., mouth piece *Piston nut*	*2838 2202* *302 0119*	*M104x2* *M55x2, KM11*	*** *200 (20)*
Widening cyl. of stabiliser leg *Piston nut*	*2833 7202* *302 0026*	*M55x2* *M24, nyloc**	*700 (71)* *700 (71)*
Fitting of controls *Control valve blocks*	*F-130 CF, H170 CF*	*M12*	*60 (6)*
Fitting of hydraulic pipes		*M10****	*40 (4)*

** When opened, remove and replace with a new nyloc-nut.*

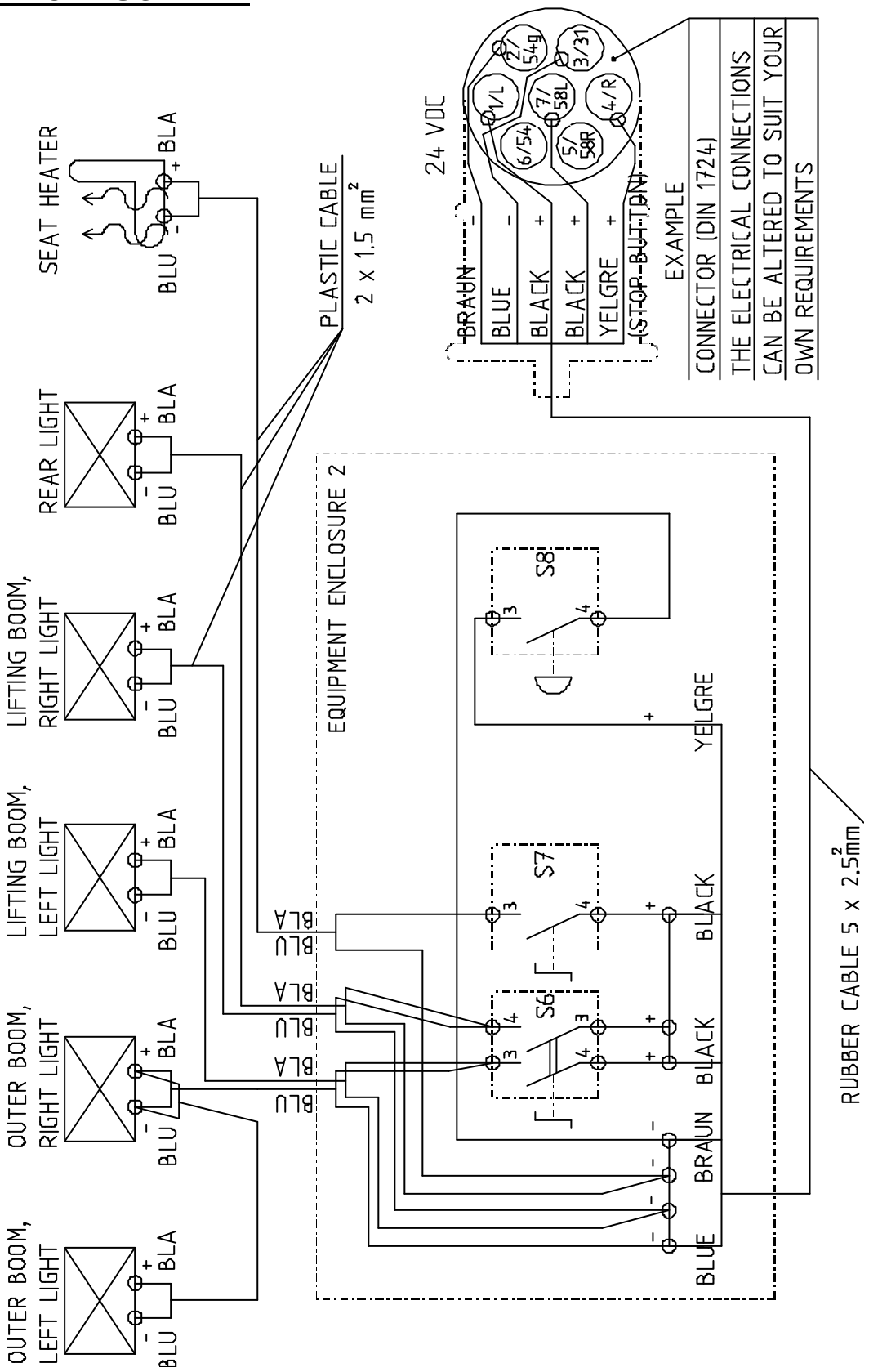
*** Screw down and secure with set screw.*

**** Secure with locking fluid e.g. LOCTITE 242 or corresponding.*

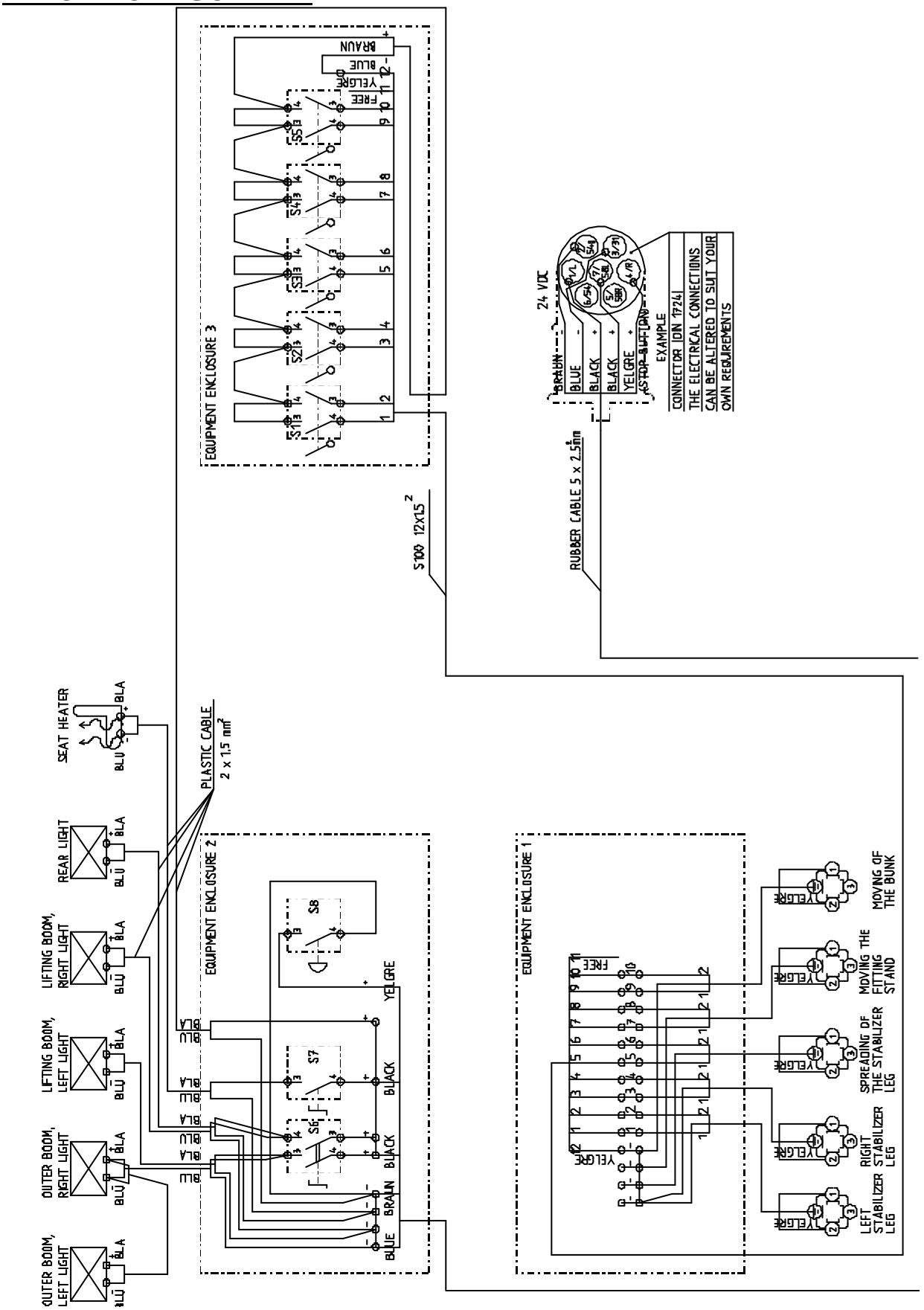
TECHNICAL SPECIFICATIONS

KESLA OYJ

ELECTRICAL SCHEME



ELECTRICAL SCHEME



GREASE FITTINGS OF THE CENTRALIZED LUBRICATION SYSTEM
(see also drawing on the following page)

FILLING:

*- use **only synthetic grease**, e.g. ESSO Fliessfett S 420.*

- it is recommended to use a harder grease (NGLI 0, 1, 2) in summer and a softer (NGLI 000, 00, 0, 1) in winter.

- use a barrel pump to fill the grease pump.

- pump grease and pull simultaneously at the lever of the stabiliser leg control valve (running-in of the spreading beams), until the pump unit is filled. The lubricant tank holds approx. 1 kg of lubricant grease.

- the pump unit has a sufficient amount of grease when the movement of the barrel pump feeding rod becomes sluggish.

OPERATION:

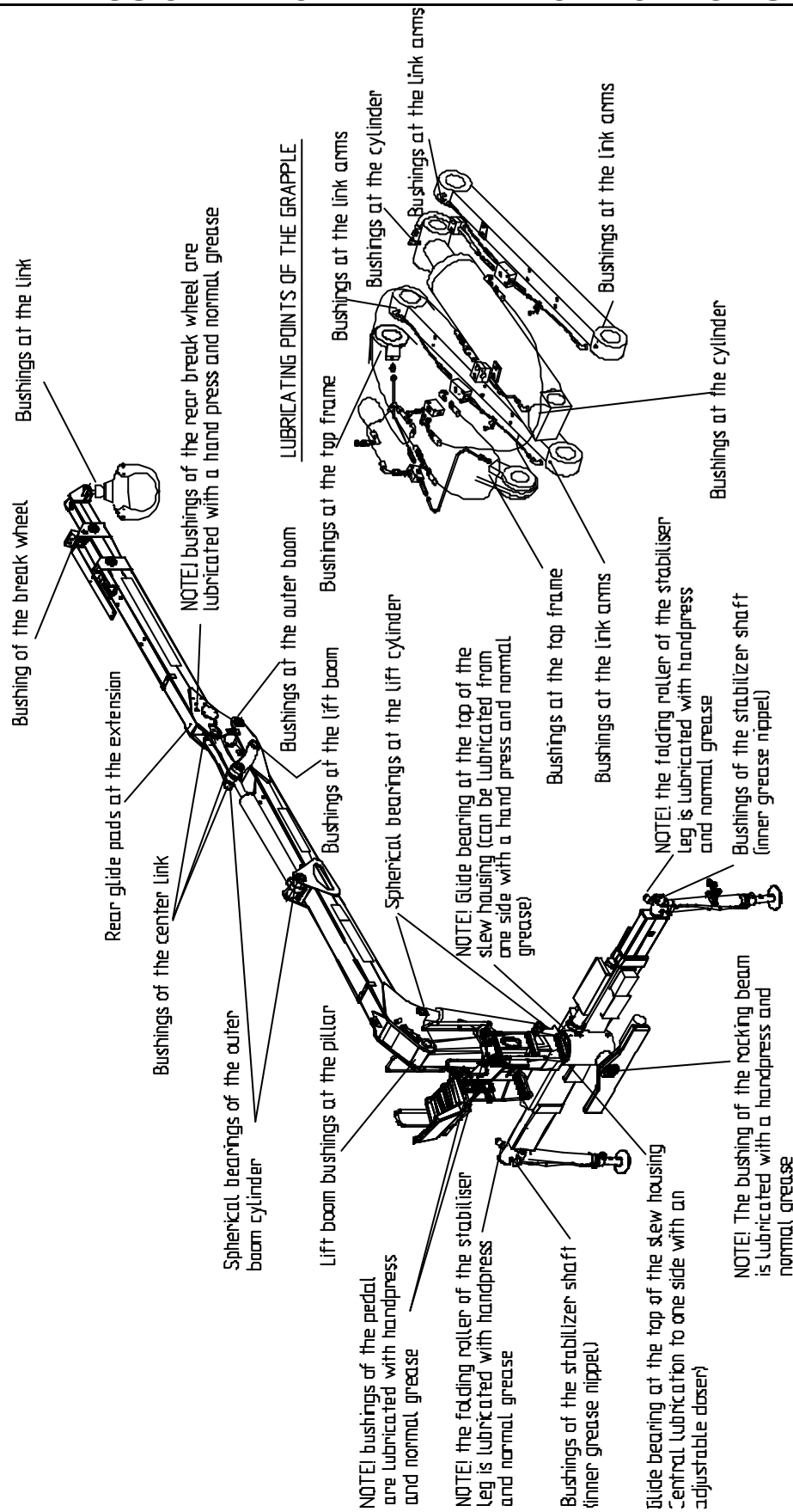
- the centralized lubrication system gets its power from the pressure of the crane hydraulic system.

*- when the stabiliser legs are spread to their outermost position the pump unit becomes pressurized and lubrication starts. **NOTE!** the pump unit requires a pressure of at least 100 bar to operate. Check daily that the pressure gauge at the point of operating indicates a pressure of approx. 160 bar during a lubrication period. If the gauge does not indicate a pressure rise, the tank is empty or there is a leak in the main line.*

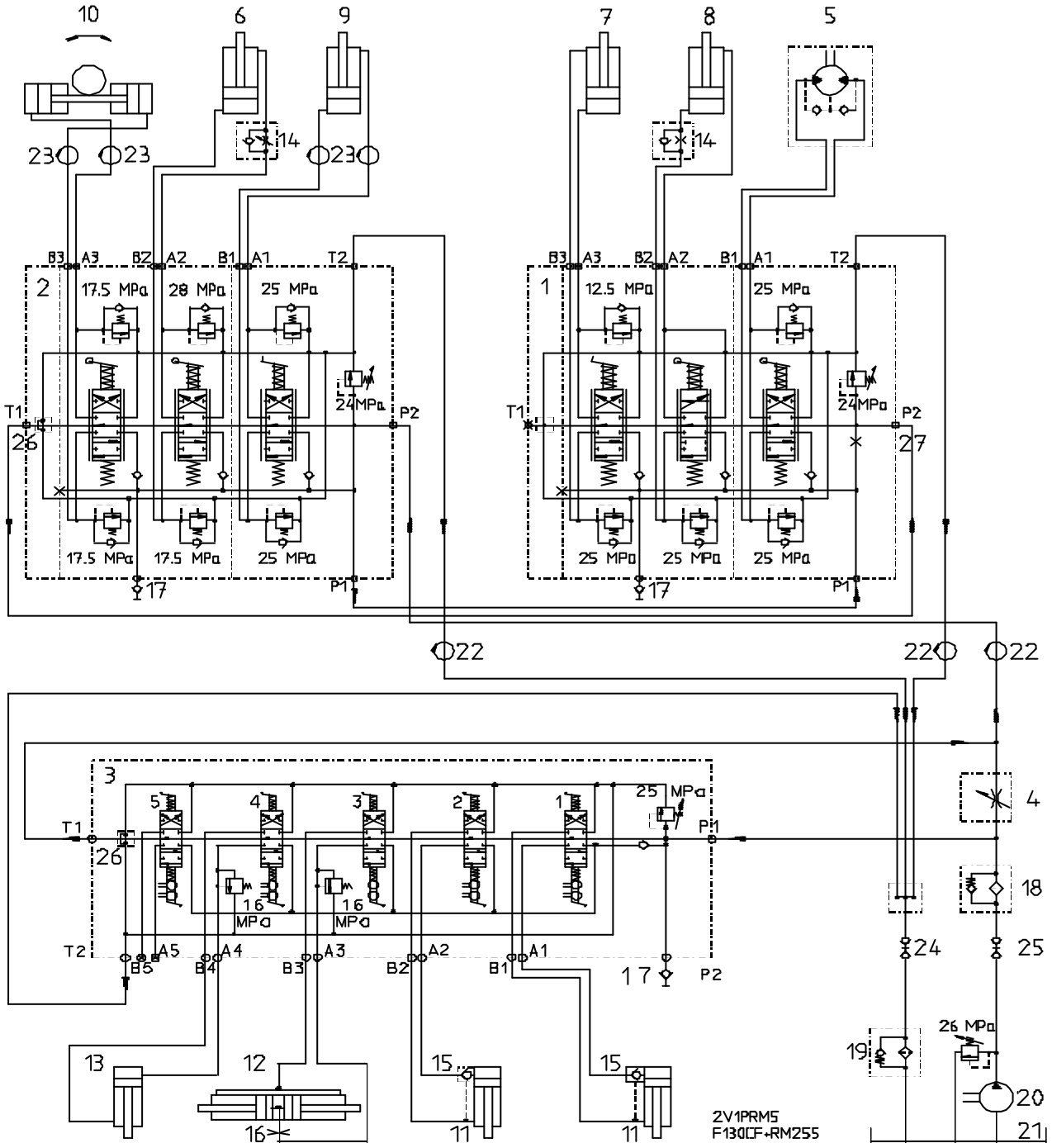
- to make sure that lubrication is effective, the pressure has to be kept on for at least five seconds

- let the pressure drop under 20 bar before initiating a new lubrication period.

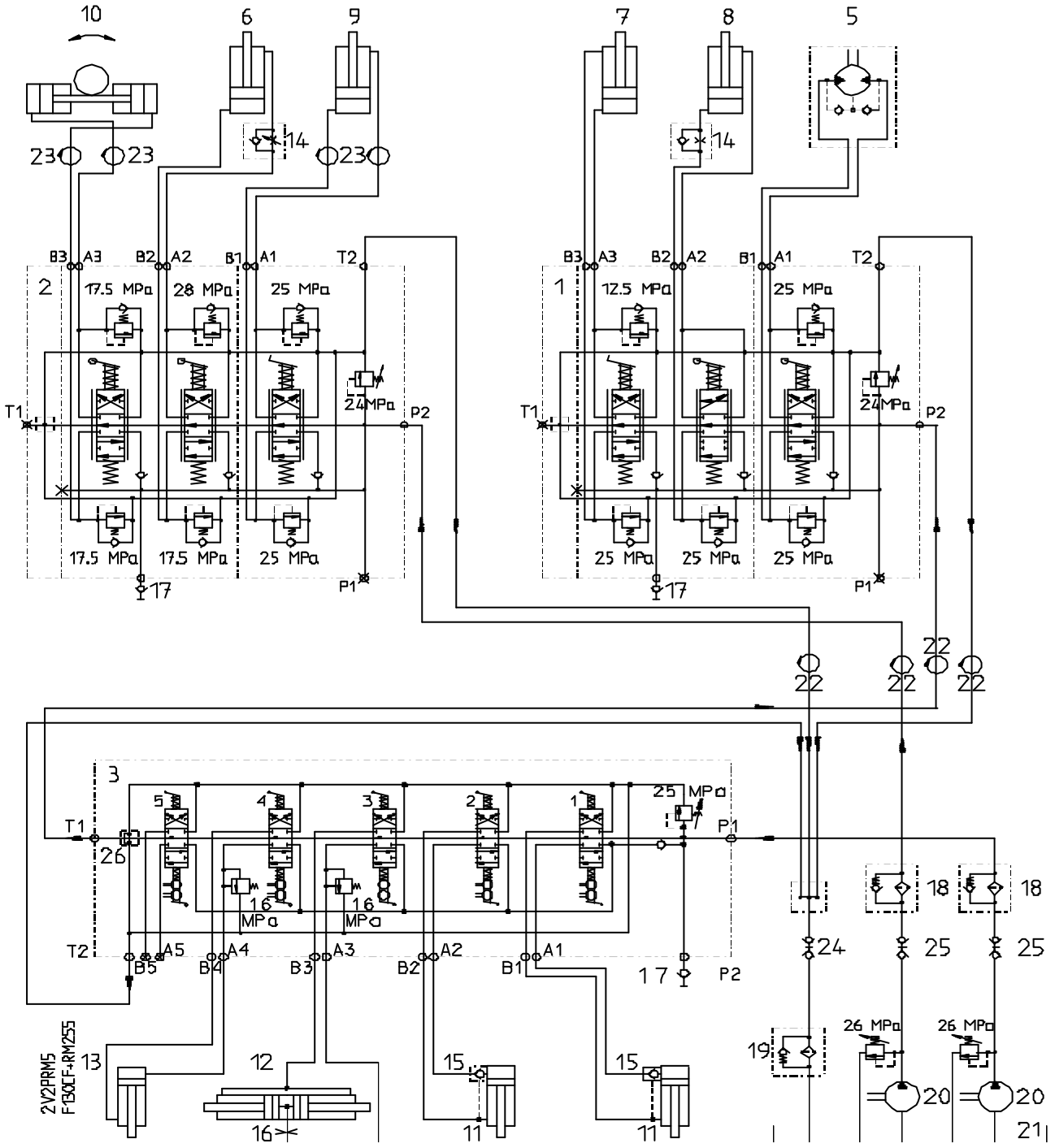
GREASE FITTINGS OF THE CENTRALIZED LUBRICATION SYSTEM


LUBRICATING POINTS OF THE GRAPPLE
Bushings at the Link
Bushing of the break wheel
Bushings at the link arms
Bushings at the cylinder
Bushings at the Link arms
NOTE! bushings of the rear break wheel are lubricated with a hand press and normal grease
Bushings at the top frame
Bushings at the link arms
Bushings at the cylinder
Rear glide pads at the extension
Bushings at the outer boom
Bushings at the lift boom
Spherical bearings at the lift cylinder
NOTE! Glide bearing at the top of the slew housing (can be Lubricated from one side with a hand press and normal grease)
Bushings at the top frame
Bushings at the link arms
NOTE! the folding roller of the stabiliser Leg is Lubricated with handpress and normal grease
Bushings of the stabilizer shaft (inner grease nippel)
Bushings of the center link
Spherical bearings of the outer boom cylinder
Lift boom bushings at the pillar
NOTE! bushings of the pedal are lubricated with handpress and normal grease
NOTE! the folding roller of the stabiliser Leg is lubricated with handpress and normal grease
Bushings of the stabilizer shaft (inner grease nippel)
Glide bearing at the top of the slew housing Central Lubrication to one side with an adjustable doser)
NOTE! The bushing of the rocking beam is Lubricated with a handpress and normal grease

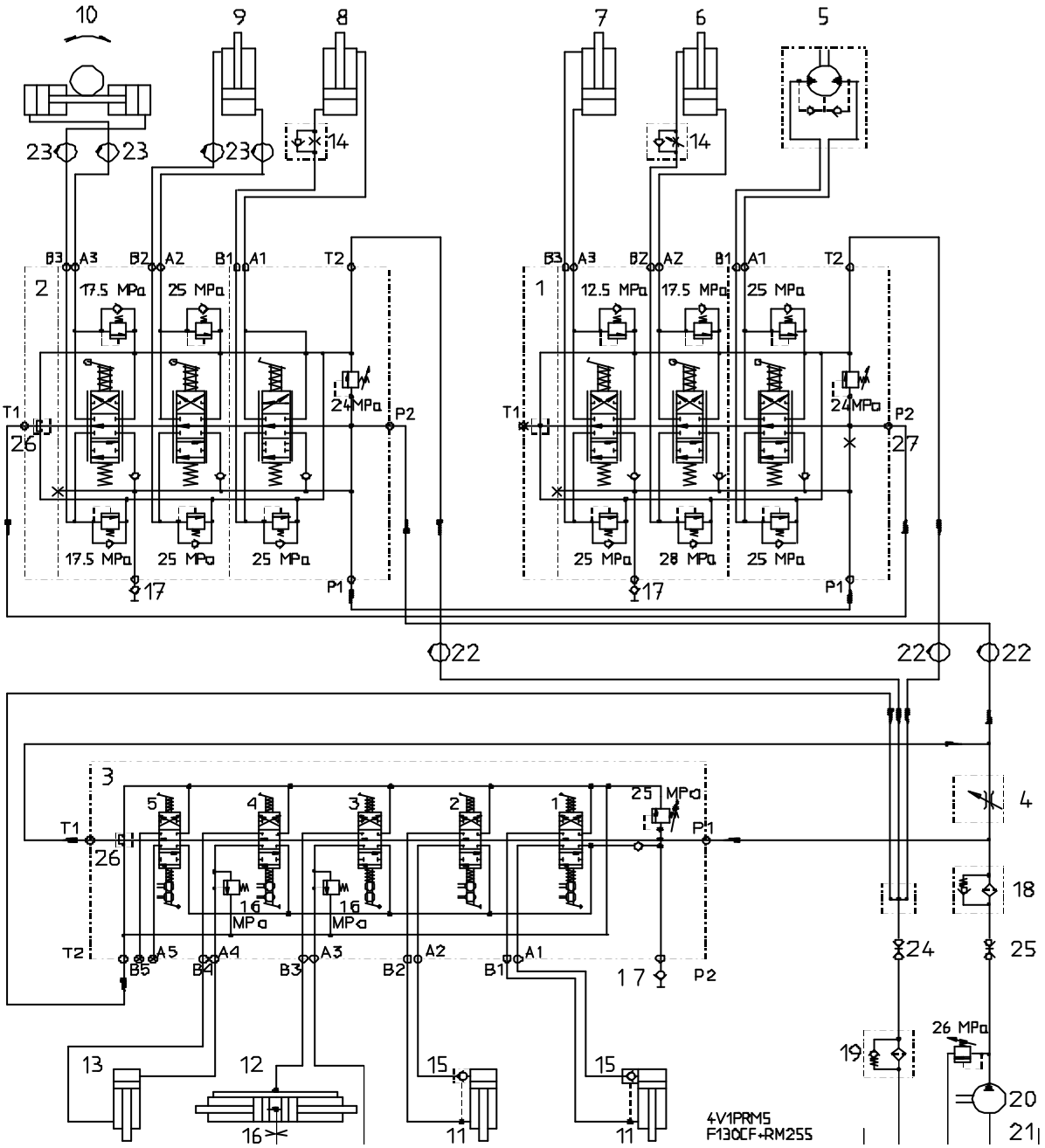
HYDRAULIC SCHEME F2008, F2008T (2- lever, 1- circuit, F130+ RM 255 valves)



HYDRAULIC SCHEME F2008, F2008T (2- lever, 2- circuit, F130 + RM 255 valves)

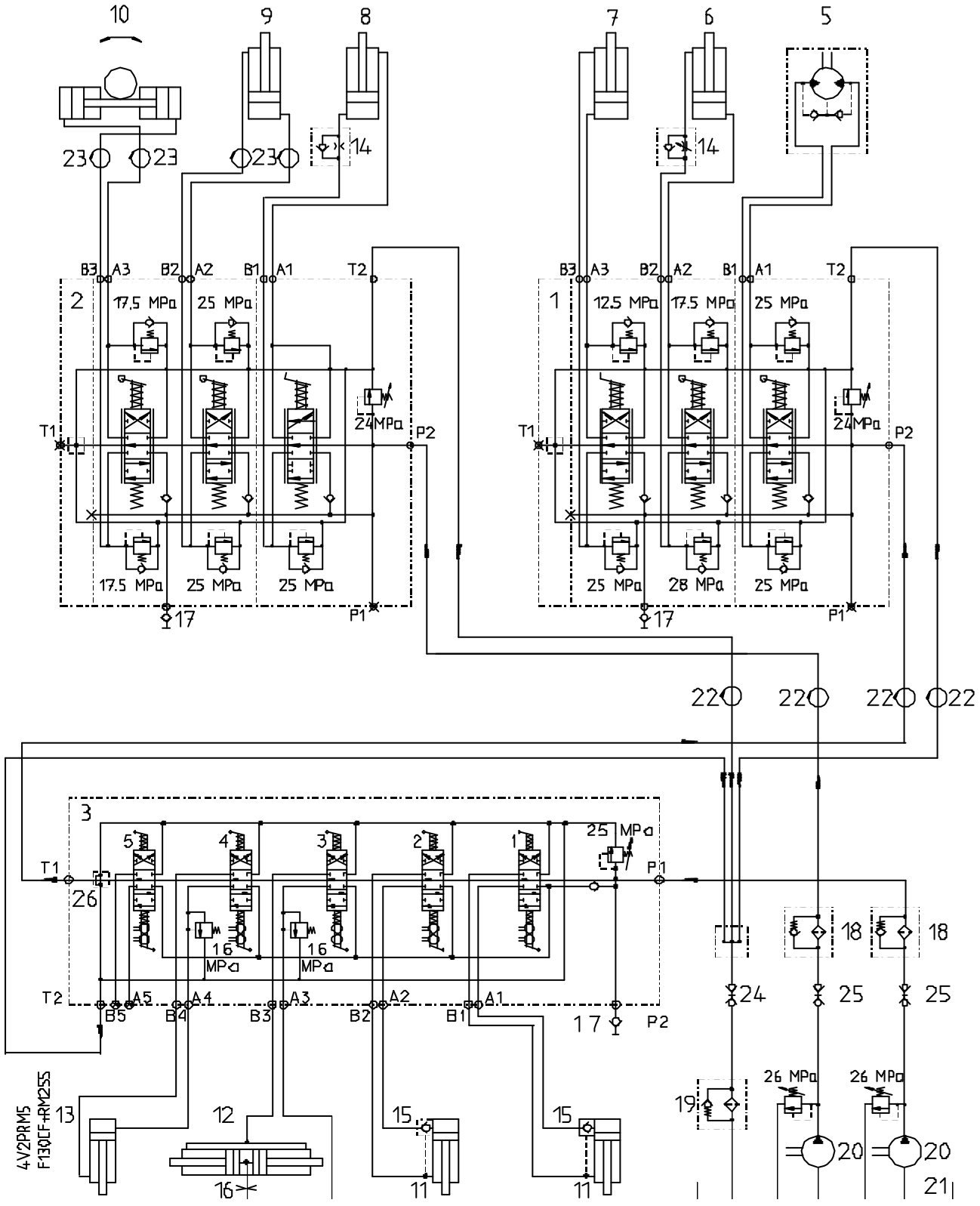


HYDRAULIC SCHEME F2008, F2008T (4- lever, 1- circuit, F130+ RM 255 valves)



TECHNICAL SPECIFICATIONS

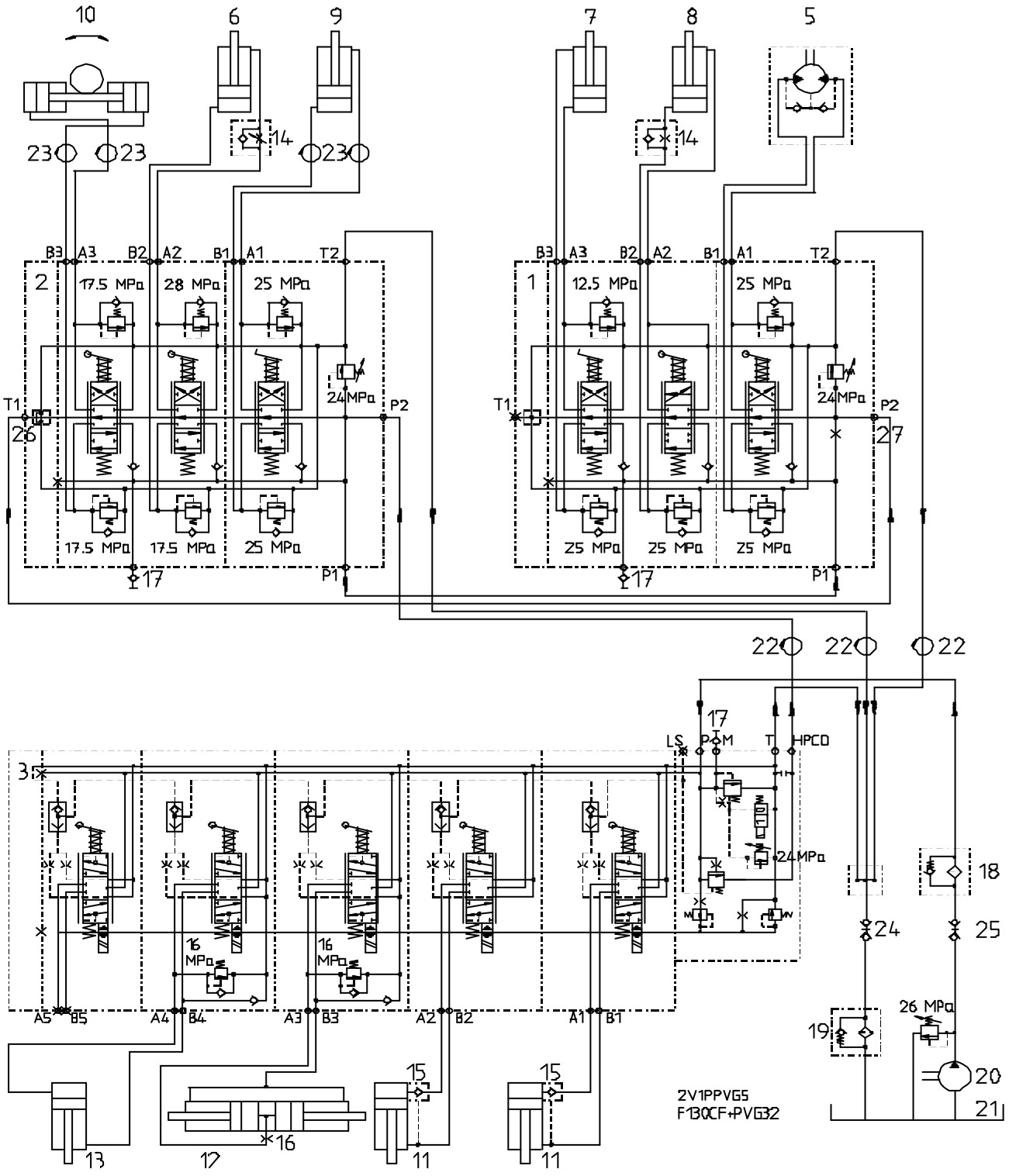
HYDRAULIC SCHEME F2008, F2008T (4- lever, 2- circuit, F130 + RM 255 valves)



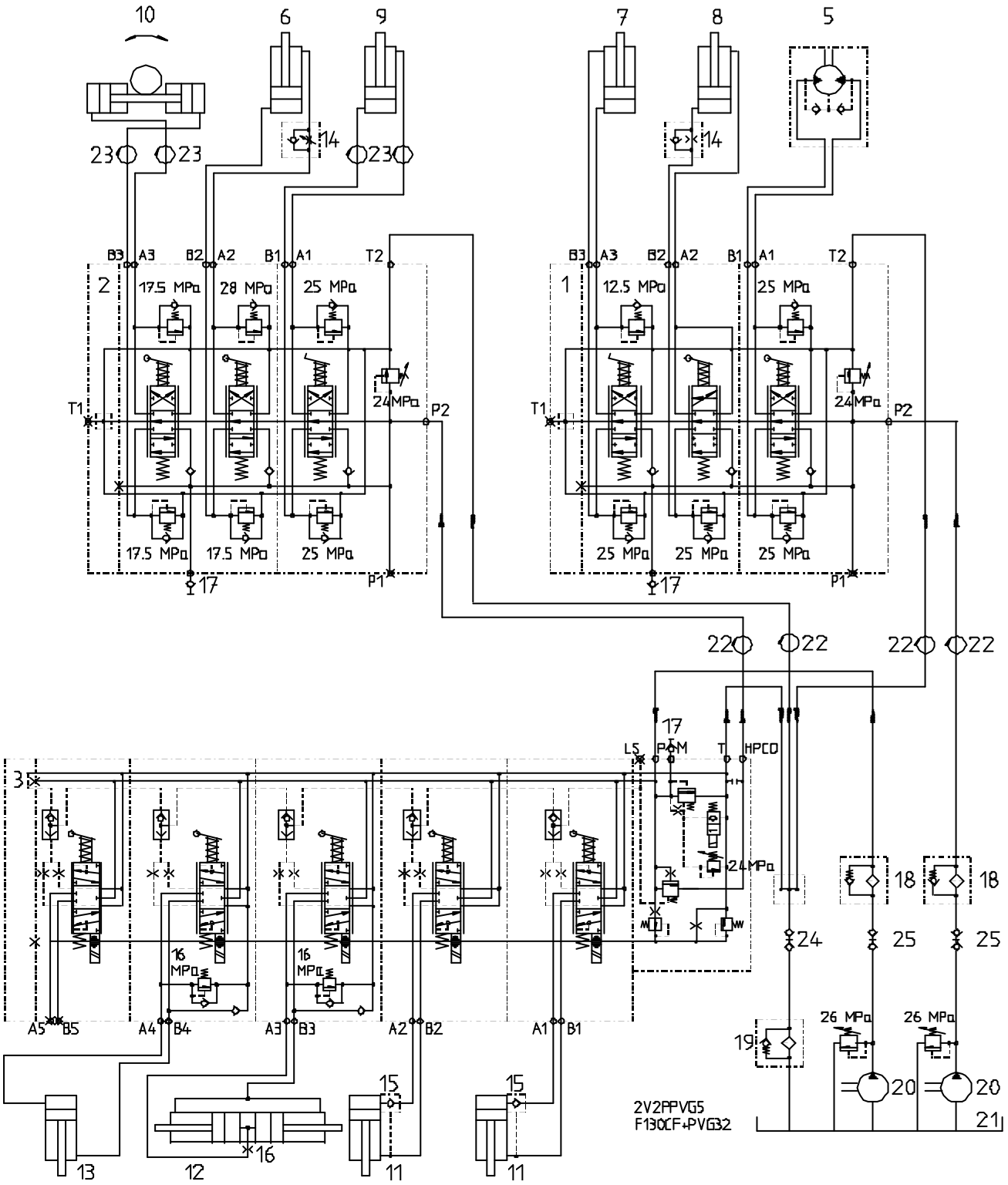
HYDRAULIC SCHEMES FORESTERI F2008, 2008T (F130 + RM 255 valves)

1	*Control valve, right*
2	*Control valve, left*
3	*Bottom control valve*
4	*-*
5	*Rotator (check pressure settings with the manufacturer))*
6	*Outer boom cylinder*
7	*Boom extension cylinder*
8	*Lifting cylinder*
9	*Grapple cylinder (check pressure settings with the grapple manufacturer)*
10	*Slewing cylinders*
11	*Stabiliser leg cylinder*
12	*Stabiliser leg spreading cylinder*
13	*Stand moving cylinder*
14	*Check valve*
15	*Pressure- controlled check valve*
16	*Reducing nipple*
17	*Pressure measuring nipple*
18	*Pressure filter*
19	*Return filter*
20	*Hydraulic pump*
21	*Oil reservoir*
22	*Swivel*
23	*Swivel*
24	*Quick connector*
25	*Quick connector*
26	*Series connection nipple (1-circuit system)*
27	*Modulating valve*

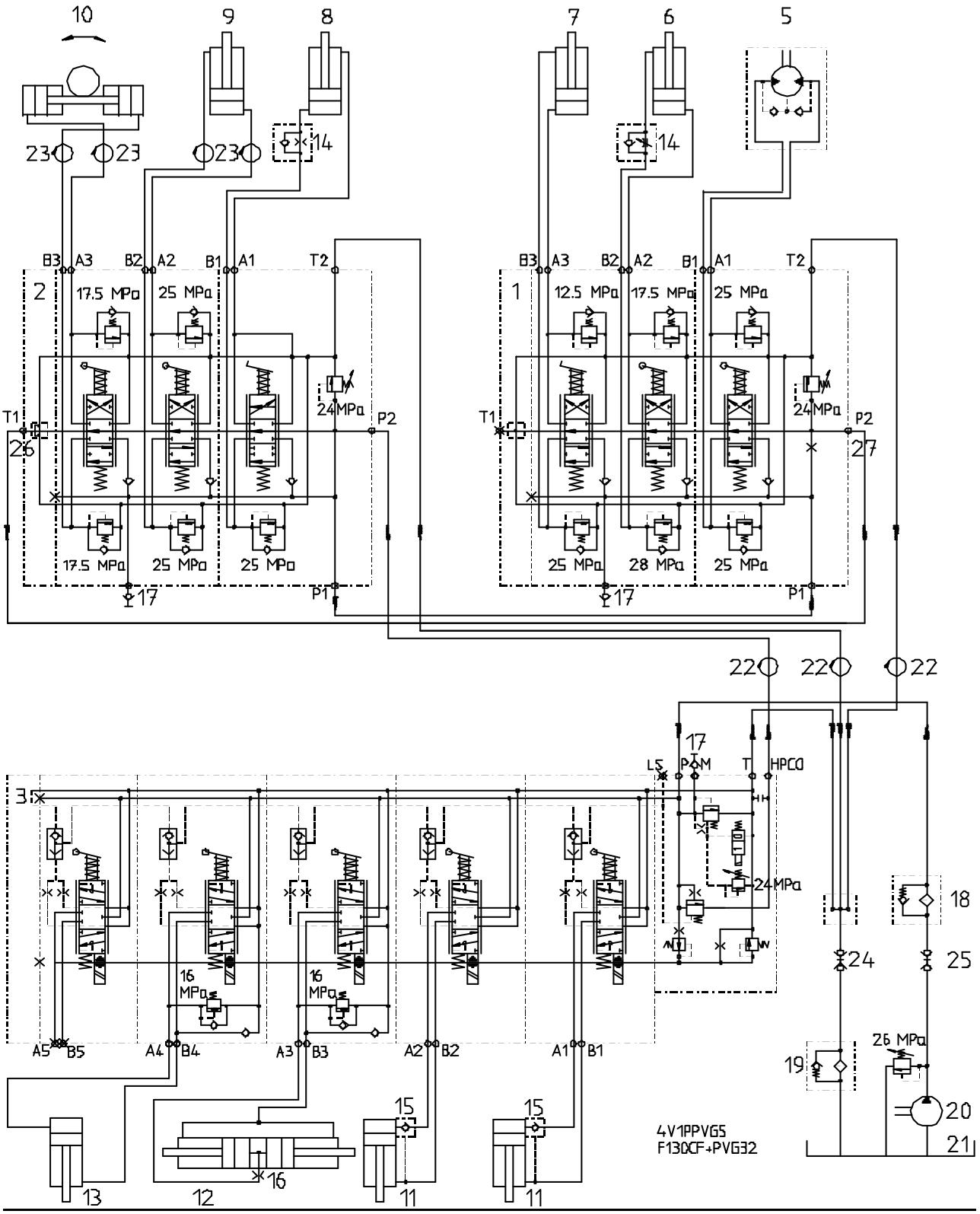
HYDRAULIC SCHEME F2008, F2008T (2 LEVER, 1 CIRCUIT, F130 + PVG 32 valves)



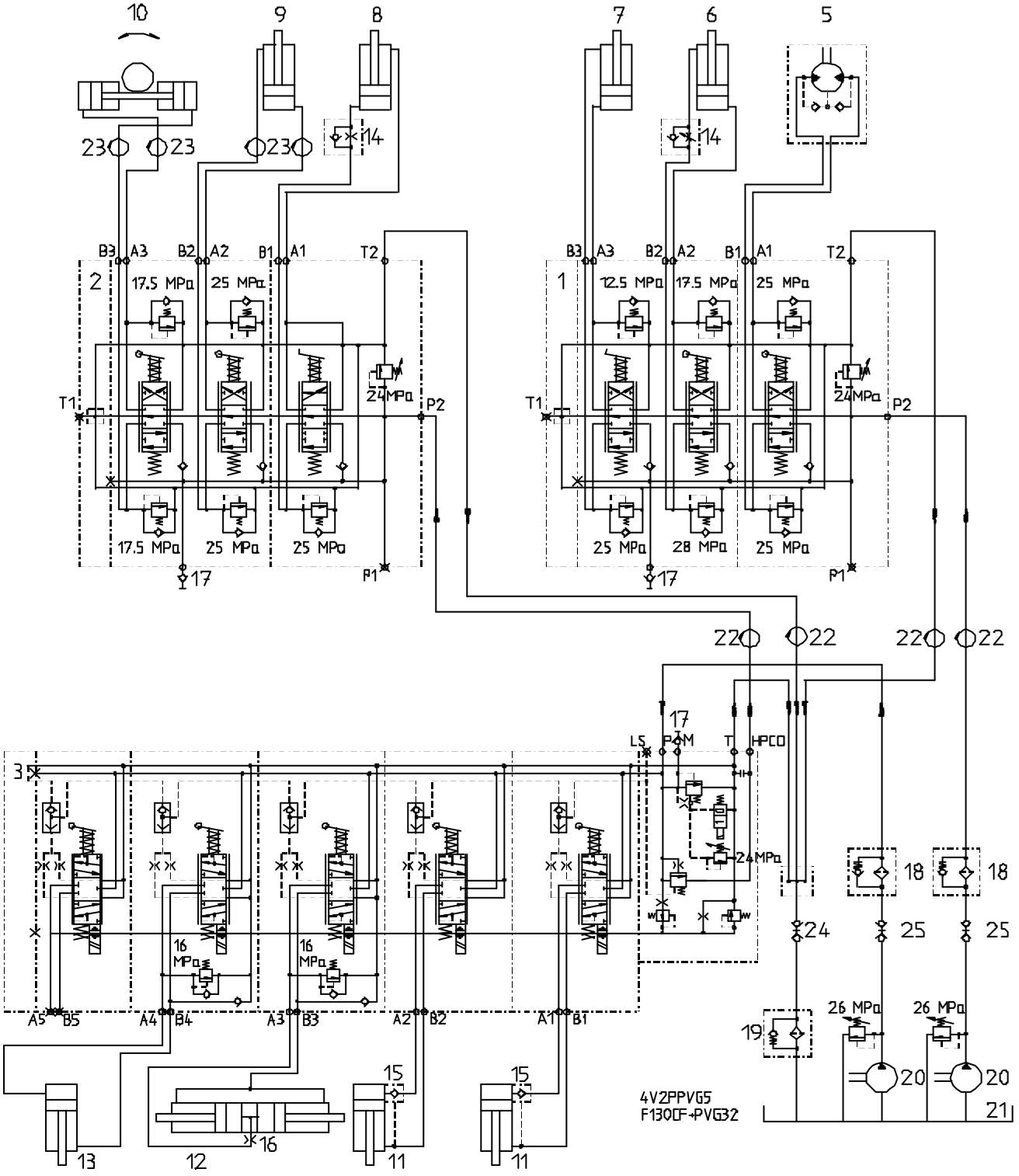
HYDRAULIC SCHEME F2008, F2008T (2 LEVER, 2 CIRCUIT, F130 + PVG 32 valves)



HYDRAULIC SCHEME F2008, F2008T (4 LEVER, 1 CIRCUIT, F130 + PVG 32 valves)



HYDRAULIC SCHEME F2008, F2008T (4 LEVER, 2 CIRCUIT, F130 + PVG 32 valves)



HYDRAULIC SCHEMES FORESTERI 2008, 2008T (F130 + PVG 32 valves)

1	*Control valve, right*
2	*Control valve, left*
3	*Bottom control valve*
4	*Selector valve*
5	*Rotator (check pressure settings with the manufacturer))*
6	*Outer boom cylinder*
7	*Boom extension cylinder*
8	*Lifting cylinder*
9	*Grapple cylinder (check pressure settings with the grapple manufacturer)*
10	*Slewing cylinders*
11	*Stabiliser leg cylinder*
12	*Stabiliser leg spreading cylinder*
13	*Stand moving cylinder*
14	*Check valve*
15	*Pressure-controlled check valve*
16	*Reducing nipple*
17	*Pressure measuring nipple*
18	*Pressure filter*
19	*Return filter*
20	*Hydraulic pump*
21	*Oil reservoir*
22	*Swivel*
23	*Swivel*
24	*Quick connector*
25	*Quick connector*
26	*Series connection nipple (1-circuit system)*

KESLA OYJ

TECHNICAL SPECIFICATIONS

The technical specification gives the constructural and functional measures as well as the lifting power and pressure settings.

TECHNICAL SPECIFICATIONS			F2008	F2008T
Lifting capacity	gross	kNm	107	
Lifting capacity	net	kNm	83	77
Reach		mm	7900	9600
Boom extension		mm	1600	2 x 1600
Slewing torque	gross	kNm	18.6	
Slewing angle		°	415	
Weight with control unit and stabilizers. Less oil, grapple and rotator.		kg	1690	1810
Pump recommendation - working pressure - flow - power input	 1 circuit 2 circuits 1 circuit 2 circuits	 MPa (bar) l/min l/min kW kW	 24 (240) 70 - 90 (F130) 2 x 60 - 80 (F130) 27 - 35 45 - 60	
Pulling force of extension		kN (kp)	24.0 (2450)	20.0 (2030)
Height: fastening level - upper link of pillar		mm	2170	
Transport width		mm	2500	

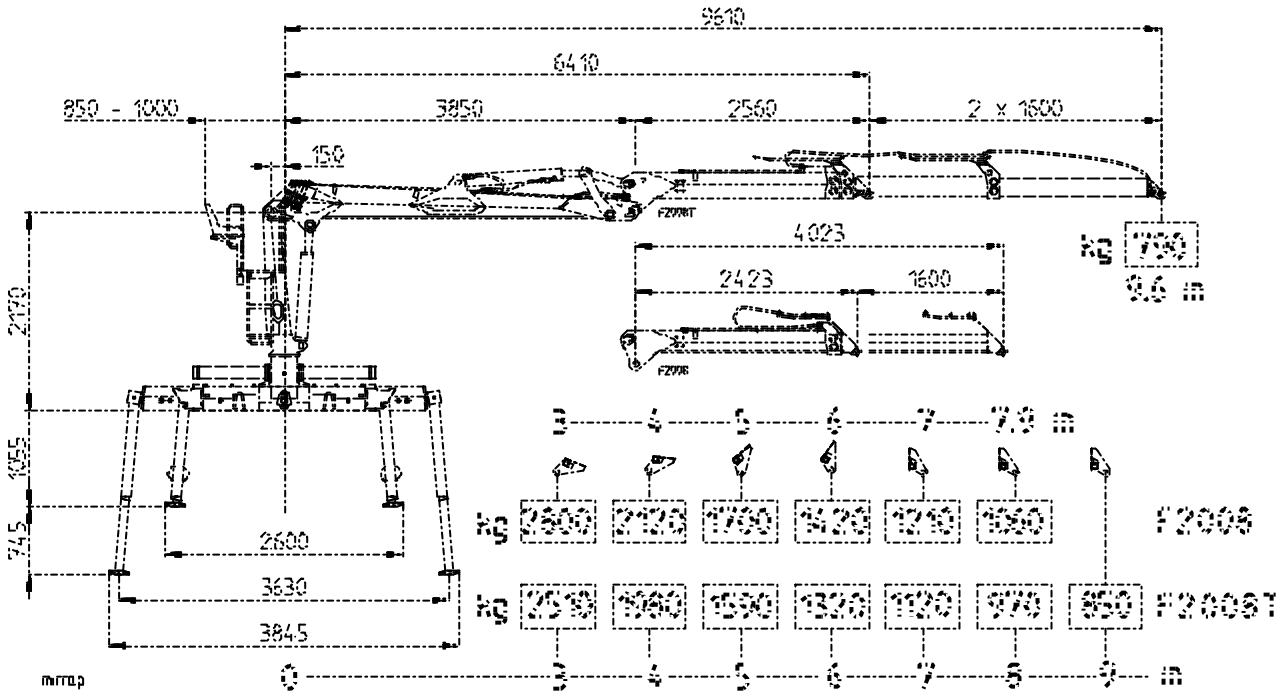
GRAPPLE ACCESSORIES

ROTATORS		MR8AF	GV11-2
Slewing angle	continuous	8	8
Slewing torque (24 MPa)	kNm	1.9	2.5
Weight	kg	56	58

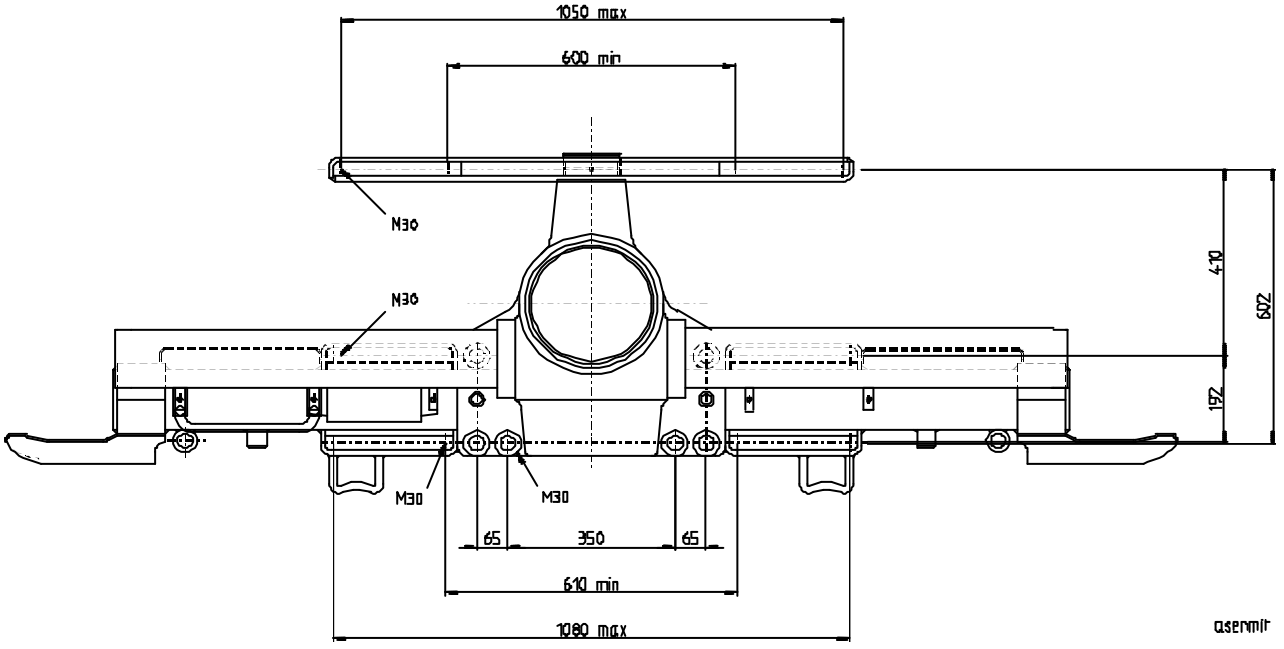
TIMBER GRAPPLES		F36	F43
Jaw pressure at the tips (21 MPa)	kN	20.0	18.0
Tip to tip	m^2	0.36	0.43
Weight	kg	220	245

TECHNICAL SPECIFICATIONS

DIMENSIONAL DRAWING

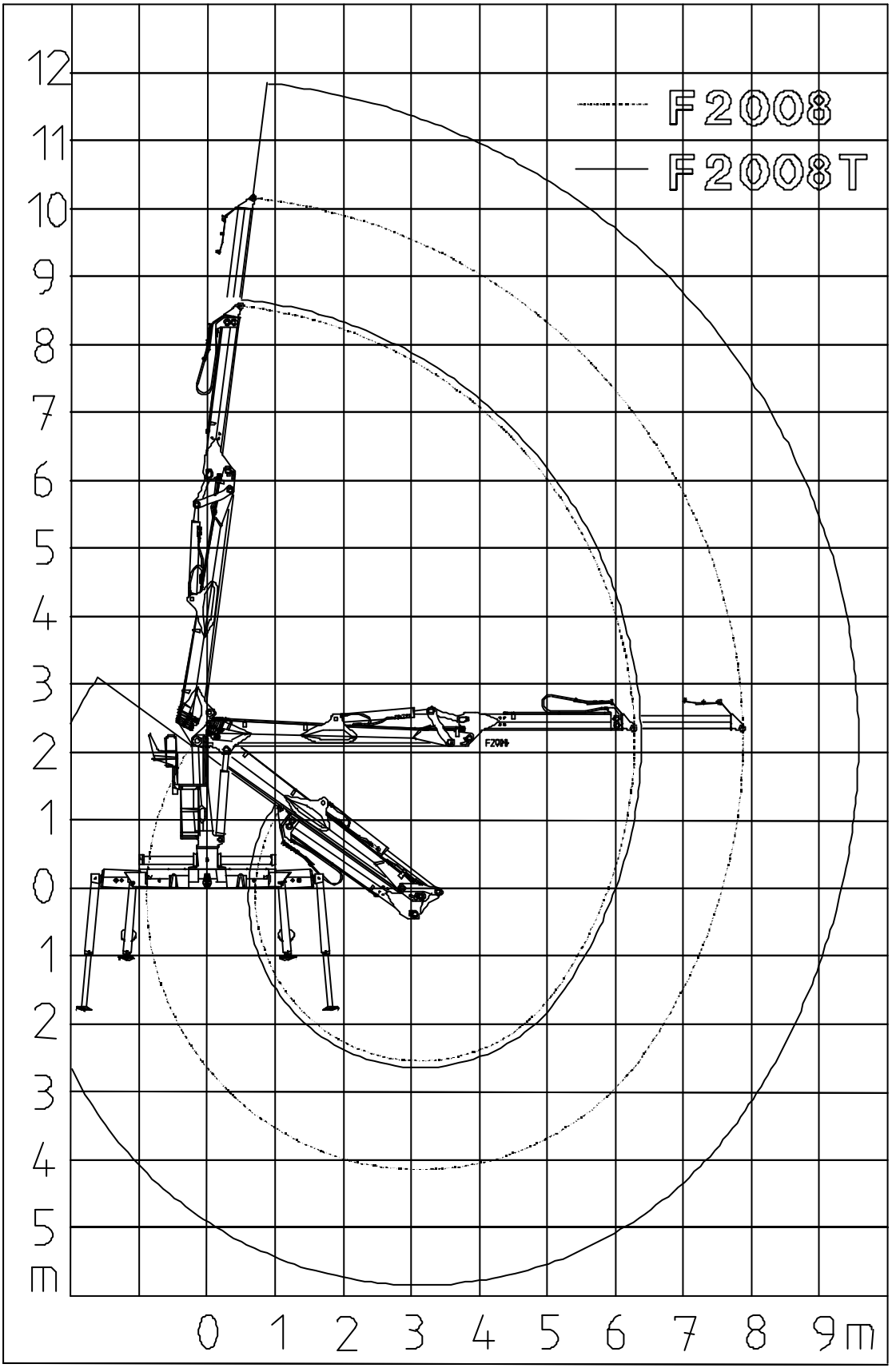


MOUNTING DIMENSIONS



OUTREACH DIAGRAM F2008, F2008T

TECHNICAL SPECIFICATIONS



INSTRUCTIONS AND WARNINGS ON CRANE

The numbered prints on the loader have warnings and instructions informing of hazards or operational directives (see picture from the previous page, numbers 1- 5). Follow these to avoid unnecessary accidents and malfunctions.

1. RISK ZONE DECAL (Background: yellow, text: black, No:328 0275)

RISK ZONE 25 m

** A large decal on both sides of the outer boom, notifies the risk zone during operation.*

** Ensure that the risk zone is clear of unauthorised persons when operating the crane.*

2. WARNING DECAL: (Background: yellow, text: black, No: 328 0264)

WARNING ! VARNING !

STAYING WITHIN THE RISK ZONE IS STRICTLY FORBIDDEN WHEN THE CRANE IS IN OPERATION !
VISTELSE INOM RISKZONEN UNDER LYFTNINGEN ÄR FÖRBJUDEN !

KEEP CLEAR OF OVER HEAD POWER WIRES !
AKTA DIG FÖR SPÄNNINGSFÖRANDE LEDNINGAR !

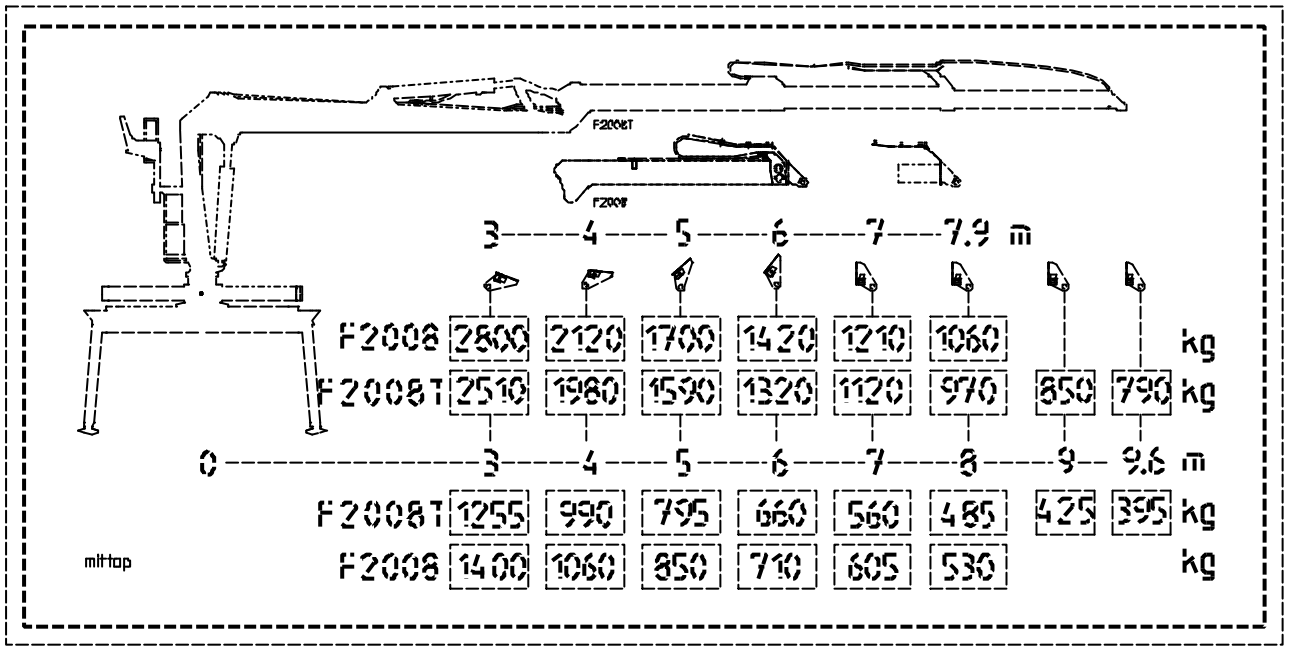
Nominal voltage Nominell spänning U kV	Minimum distance from uninsulated wire Minimiavstång fron oisolerad ledning m	Minimum distance from insulated wire Minimiavstång fron isolerad ledning m
U ≤ 1	2	0.5
1 < U ≤ 45	3	1.5
U > 110	5	

** The decal is placed at the point of operating and absolutely forbids persons loitering within the risk zone when loading (risk zone 25 m).*

** The decal warns of live electrical conductors. If you must work or drive under such conductors, always follow the minimum safe approach distances given in the table*

INSTRUCTIONS AND WARNINGS ON CRANE

3. SAFE WORKINGS LOAD PLATE



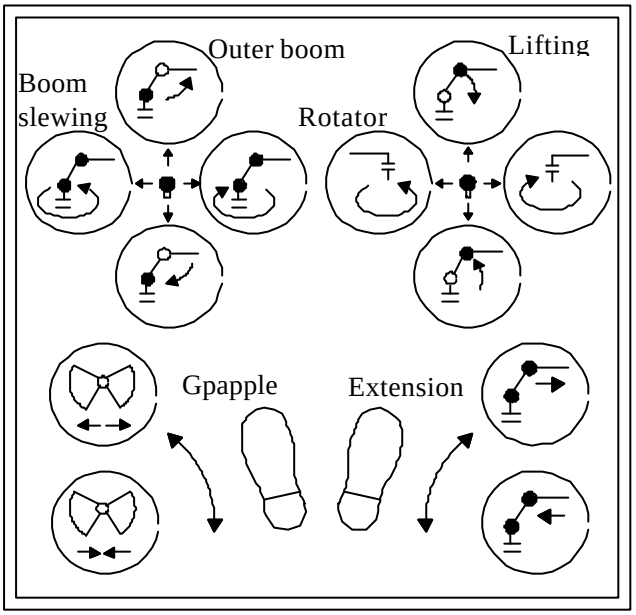
** The load plate is placed at the point of operating and notifies the max. allowed working loads for different lifting radii.*

** If the stability factor of a combination with a rear fitting stand is 0.75... 1.0, use halved lifting values in the beginning of loading.*

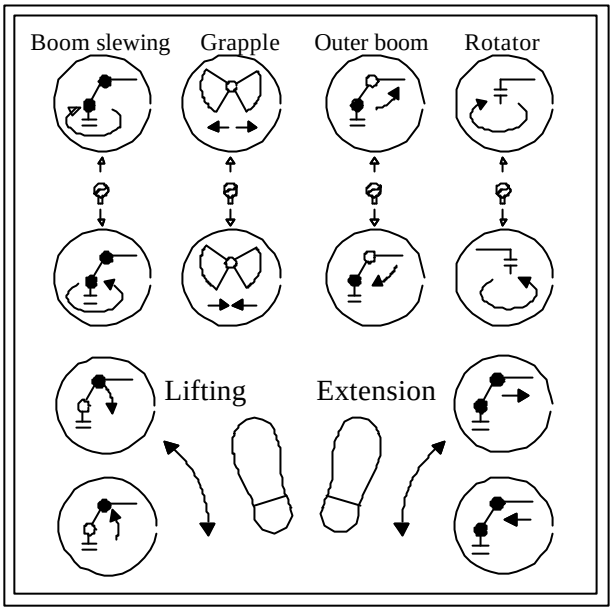
INSTRUCTIONS AND WARNINGS ON CRANE

4. CONTROL LEVER DECALS (Background: yellow, text: black)

2- LEVER CONTROL VALVE
(No: 328 0231)



4 - LEVER CONTROL VALVE
(No: 328 0197)

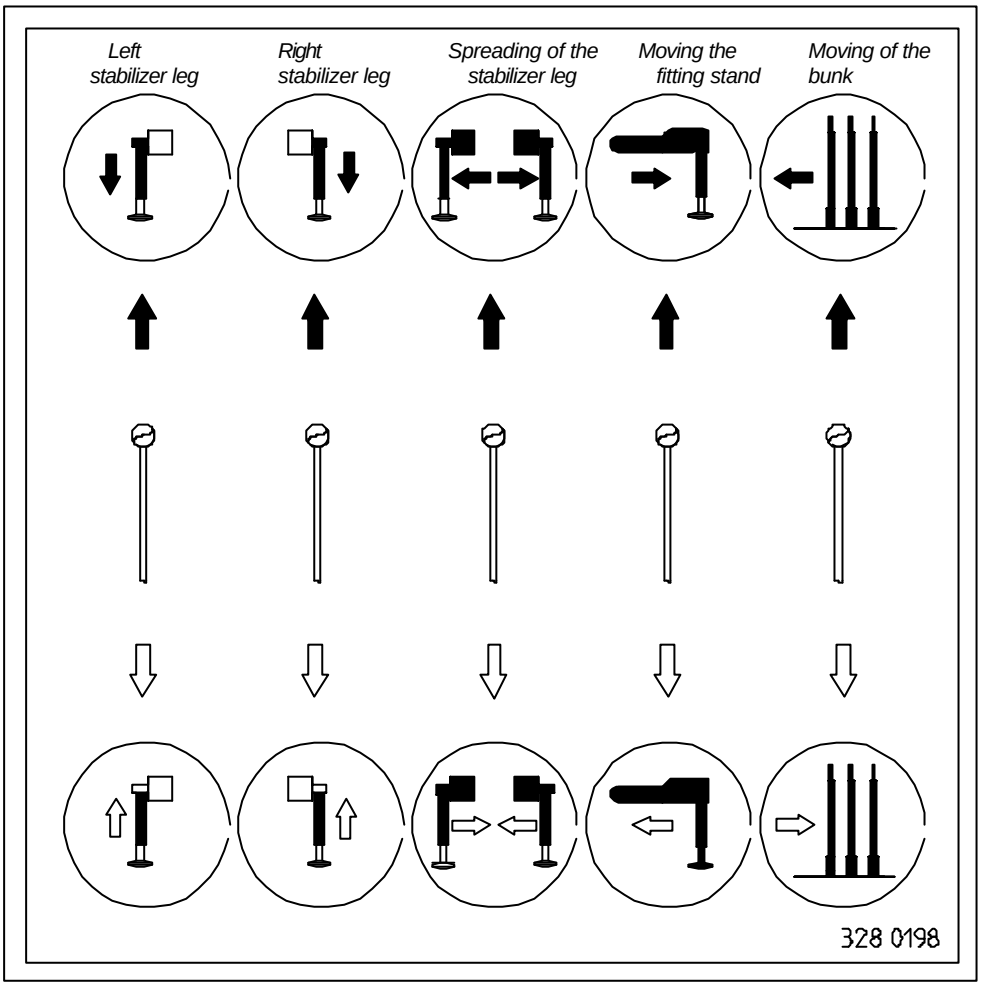


** The control lever decal is placed at the point of operating and is referring either to 2-lever or 4-lever control valves.*

** The decal shows the lever and pedal functions.*

INSTRUCTIONS AND WARNINGS ON CRANE

5. BOTTOM CONTROL LEVER DECAL (Background: yellow , text: black, No: 328 0198)



** There are 2 bottom control lever decals. One is placed at the point of operating and one at the bottom point of operating.*

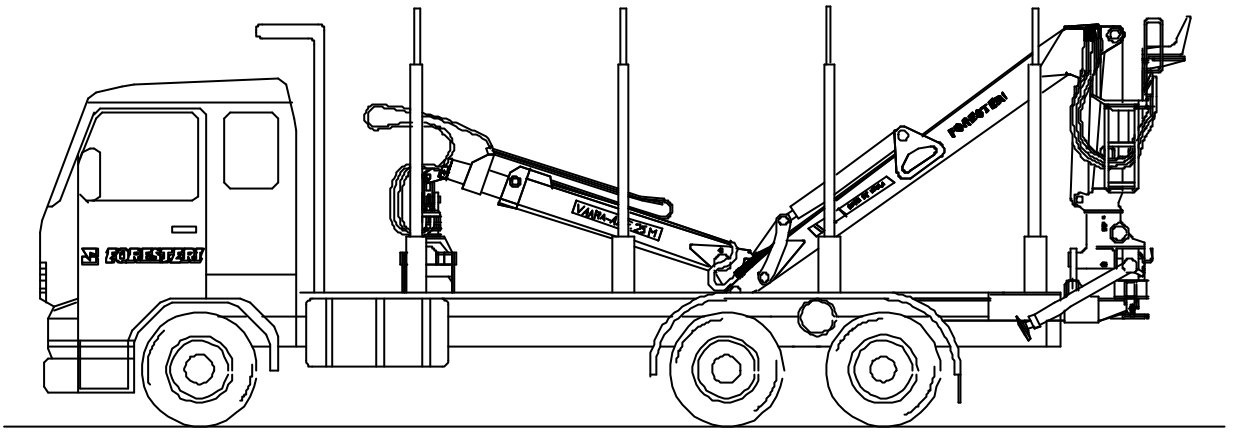
** The bottom control valve (= stabiliser leg valve) can be used from the upper point of operating of the crane electrically with levers or mechanically by means of cable control. The crane can also be controlled directly by means of the valve levers at the bottom point of operating.*

** The bottom control valve may have 3...5 functions depending on the fitting method of the crane and the equipment of the vehicle. E.g. moving of the bunk ® bottom control valve with 5 stems. Fixed mounting, bunk can not be moved ® bottom control valve with 3 stems.*

STANDARD MODELS AND ACCESSORIES

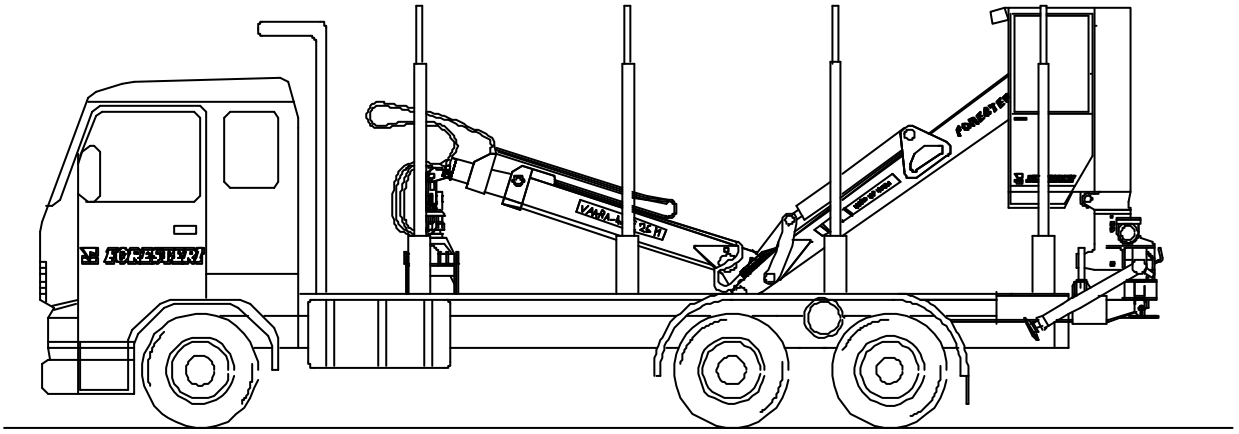
Foresteri truck cranes have passed an operational test after assembly and are ready to be used. There are several models to be chosen from.

- Basic crane



** The control equipment can be fitted directly behind the pillar or with the aid of wedges diagonally to the right or left side, in which case the boom does not obstruct the view.*
** Control valve with 2 or 4 levers.*
** Bottom control valve (= stabiliser leg valve) with 3-5 spools depending on what functions are required (e.g. moving of the bunk, moving of the fitting stand) In addition, it can be either electrically or mechanically controlled.*
** Outer boom alternatives: single or double extensions.*
** Hydraulic system alternatives: 1 circuit (1pump) or 2 circuits (=2 pumps). In addition, the system can be equipped with a fixed-output pump or variable-capacity pump.*

- Cabin crane



** The cabin is fitted on guide bars attached to the sides of the pillar, and it can be hydraulically moved up and down.*

STANDARD MODELS AND ACCESSORIES

** Controls (with 2 or 4 levers) are situated in the cabin. Control valves are operated either mechanically (located in cabin) or electrically (located on pillar).*

** The equipment alternatives for the actual crane are the same as for the basic crane.*

** The cabin comes with e.g. the following standard equipment: heater, 2 windshield wipers/washers, interior light, 3 working lights, seat + arm-rests, safety glasses in front, sun roof (safety glass)*

- Accessories:

With the following accessories the crane is even more pleasant to use:

** Timber grapple*	*(e.g. Foresteri 36/43, Vahva 40, Hultdins 40)*
** Rotator + link set*	*(e.g.. Indexator GV11-2, MR8AF...)*
** Working light set*	*(2, 4, or 5 lights)*
** Seat heater*	
** Seat back extension*	
** Centralized lubrication system (down to the grapple)*	*(e.g. Safematic)*
** Loading scales*	*(e.g. KA-60)*
** Rear fitting stand*	*(customized versions also)*
** Cylinder for moving the fitting stand + fastening set*	*(pocket/conical model)*

SERVICE PROCEDURE

1. GENERAL

** Maintain the crane regularly to ensure its safe and troublefree function.*

** All the tools needed for the service of Foresteri cranes are included in the delivery. Thus the operator can carry out almost all the service himself.*

** Do not ever, without the manufacturer's permission, alter the relief valve pressure settings to settings differing from the ones given in the hydraulic scheme. Have an authorized service shop do the valve adjustments and repairs.*

** The crane is thoroughly factory tested and adjusted before delivery.*

** Never use a faulty crane, but repair even minor faults and defects before they cause damage (refer to Daily overhaul prior to operation).*

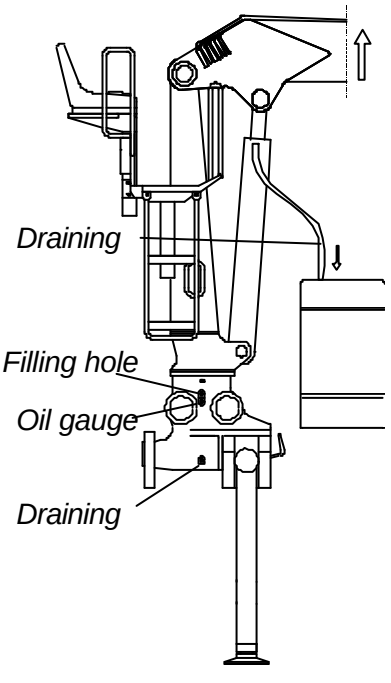
** The tables Service procedure for periodical inspections and service, and Trouble shooting for fault locating, will make these measures easier for you.*

** The persons responsible for the use and service of the crane must be familiar with these instructions.*

2. OIL CHANGE

** Change the hydraulic system oil in the spring and in the fall or every 1000 operating hours. When all the hydraulic piston rods are pulled back, the oil volume of the crane is at its smallest. Then empty the oil reservoir and clean it, if needed, and replace the filter cartridges. Fill the reservoir with hydraulic oil to the upper mark (refer to Oils and lubricants). If the oil is very dirty, drain the cylinders separately as follows. Remove the hose on the rod side and put it in a waste oil vessel. Drive the piston rod out and connect the hose.*

** Change the slew mechanism oil once a year and drain the water 2 times/year. Check the oil quantity from the oil gauge and change the oil by opening the draining and filling plugs. Incline the crane in the direction of the draining plug. When the reservoir is empty, screw the draining plug back and fill hypoid oil into the slew mechanism to the upper edge of the oil gauge (refer to Oils and lubricants). ALWAYS DRAIN THE WASTE OIL*



INTO A VESSEL AND SEND IT AWAY FOR FURTHER TREATMENT.

SERVICE PROCEDURE

Service point		*Procedure*	*Service interval/h*	*Note!*
General	*1*	*Check cylinders and hoses for leakages*	*10*	*Daily*
	2	*Check pin fastenings and mounting bolts of crane*	*10*	*Daily*
	3	*Check condition of hoses and hose couplings*	*50*	
	4	*Clean load-bearing structures and check their condition*	*250*	
Slew mechanism	*5*	*Grease bushings with grease gun*	*10*	
	6	*Tighten mounting bolts*	*250*	*1200 Nm Initially after 50 h*
	7	*Check oil quantity*	*10*	
	8	*Change oil*	*1000*	*11.2 l Initially after 50 h*
Booms	*9*	*Grease bushings with grease gun*	*10*	
	10	*Check bushings*	*250*	
	11	*Check the position of cylinder mouth pieces and pins*	*250*	*Tighten if needed*
Extensions	*12*	*Grease bushings with grease gun*	*10*	
	13	*Brush grease on extensions*	*50*	
	14	*Check horizontal clearance*	*50*	*Adjust if needed*
	15	*Check vertical clearance*	*250*	*Adjust if needed with shims*
	16	*Tighten the link pins*	*250*	*Initially after 50 h*
Chains	*17*	*Lubricate chains*	*50*	
	18	*Check chain tension and adjust, if needed*	*50*	
	19	*Clean chains*	*1000*	*Change if needed*
Controls	*20*	*Grease joints*	*50*	
	21	*Check mounting bolts*	*250*	*Tighten if needed*
Hydraulic system	*22*	*Change pressure filter*	*500*	*Initially after 50 h*
	23	*Change return filter*	*1000*	*Initially after*

				50 h
	24	*Change hydraulic oil*	*1000*	*At least 2 x / year*
Control cables	*25*	*Grease*	*In ice conditions*	*At least 1 x / month*

TROUBLE SHOOTING CHART

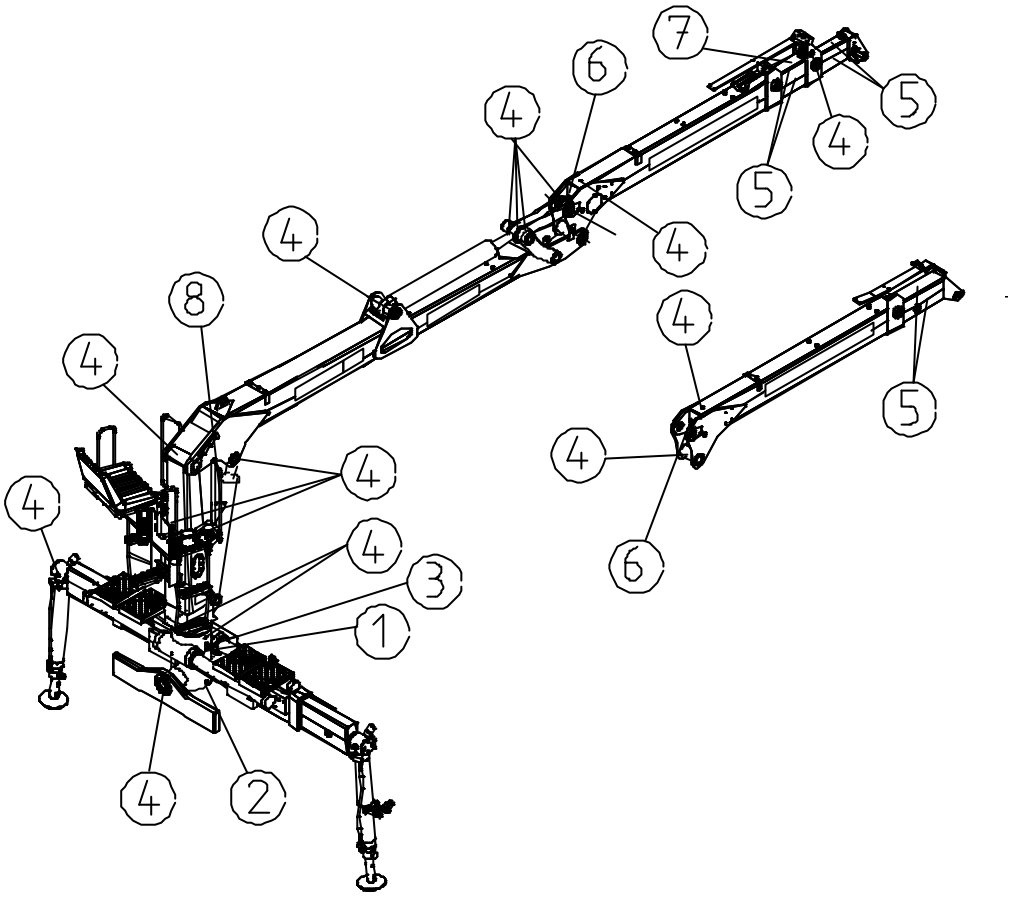
The chart shows the most probable malfunctions with causes and how to correct them. Contact the service department for more information. Do not ignore the safety instructions when repairing!

MALFUNCTION	*POSSIBLE CAUSE*	*MEASURE*
The crane is not moving	*- Empty oil tank* *- Pressure hose connector not properly connected or faulty* *- Pump does not generate pressure*	*- Add oil* *- Check the connector, replace with new quick coupling, if needed* *- Measure pressure from the pump section of control valve, check the relief valve of pump*
The crane moves some or is powe r-less	*- Return hose connector not properly connected or faulty* *- Main relief valve or pump relief valve defective or dirty*	*- Check connector, measure back pressure* *- Measure pressure from the tank section end, check and if needed, replace with new relief valve*
One function powerless	*- Relief valve at the particular section faulty or dirty*	*- Measure pressure of this function, replace new valve if needed*
Booms don't stay up under normal load	*- Relief valve of this particular function leaking* *- Cylinder seal leaking* *- Valve spool leaking*	*- Replace relief valve* *- This particular function goes down under load and cylinder is overheating when loading.* *- Change seals.*
Hydraulic system overheats	*- Leakage in the pump* *- Pump flow too high for the control valves* *- Not enough oil in hydraulic system*	*- Measure pressure while the oil is hot. Replace with new pump, if needed.* *- Measure back pressure, run the pump at lower speed.* *- Add oil.*
Valve spools get stuck	*- Overheated hydraulic oil* *- Dirt in valve* *- Studs connecting the valve sections too tight or too loose*	*- Refer to above* *- Check if oil and filters have been changed acc. to instr.* *- Check tensioning torques*
Oil leaking from the slew housing	*- Slew cylinder seal leaking* *- Too much oil in the mechanism* *- Radial seal leaking*	*- Change seals, if needed (the seals might let some oil by, when oils are very cold).* *- Tighten by winding the pin*

		valve spring, replace with new pin valve, if needed.

SERVICE PROCEDURE/LUBRICATION POINTS

NOTE! LUBRICATE THE SPHERICAL BEARINGS AND BUSHINGS OF BOOMS WITH GREASE, MOLYBDENUM CONTENT (~ 2 %). UNIVERSAL GREASE WILL DO FOR OTHER POINTS.



NOTE! SHORTEN THE LUBRICATION INTERVALS, IF WORKING CONDITIONS ARE UNFAVOURABLE, E.G. DUSTY.

Ref	Service spot	Pcs	Measure	Lubricating interval / h
1	*Slew mechanism, oil gauge*	*1*	*Check*	*10*
2	*Slew mechanism, lower plug*	*1*	*Drain, water draining 2 times / year*	*1000*
3	*Slew mechanism, upper plug*	*1*	*Oil change, add if neede*	*1000*
4	*Spherical and bushings*	*20/22*	*Grease with grease gun*	*10*
5	*Outer surfaces of extensions*	*1/2*	*Greasing / oil*	*50, (SAE 10W50)*
6	*Inner surfaces of extensions*	*1/2*	*Greasing / oil*	*50, (SAE 10W50)*
7	*Chains (double exten-*	*2*	*Greasing / oil*	*50, (SAE 10W50)*

	sions)			
8	*Bottom control cables*	*4/5*	*Greasing in icy conditions*	*At least 1 x / month*

Lubrication of the bottom control cables:

** Lubricant: mixture of non-freezing solution and water - 50 % / 50 %*

** Open the plug of the fixing bushings at the upper end of the cable and run lubricant mixture into the cable. It is also possible to fully detach the cable.*

POINTS OF LUBRICATION

1.SLEW MECHANISM

- Few strokes of the grease gun is enough.

** Grease the top bearing of the slew mechanism (2 grease nipples) regularly.*

** The other parts of the slew mechanism are oil immersed. Check oil quantity through the oil gauge with the machine standing on even ground. Add, if needed (hypoid oil SAE 80W/90).*

** The slewing link at the upper end of the stabiliser leg has 2 grease nipples and the front beam 1 grease nipple.*

2. MAIN LIFTING BOOM

- Grease the bushings with so many strokes that you see old grease moving out.

** The bushing in the upper part of the slew pillar has 1 grease nipple.*

** The bushing in the link between the main lifting boom and outer boom has 2 grease nipples.*

** Grease the bushing in the main lifting boom links from the grease nipple located at the lower side of the boom.*

** The intermediate links have 3 grease nipples.*

** Grease the spherical bearings (4 pcs) of the main lifting and outer cylinder regularly.*

3. OUTER BOOMS

** Grease the rear glide pads of the extension from the grease nipple top of the outer boom. Keep the extensions retracted.*

** In a double extension model grease the bushings of the chain gear (2 pcs) from the grease nipple at the pin end (with the extensions retracted).*

** All the grease nipples of the crane can be lubricated at a time by turning the outer boom, with the extensions retracted, in an inclined position under the main lifting boom. In this position the inner surfaces of the extensions and the inner chain will be lubricated through the back end of the outer boom.*

** Finally extend the extensions fully and lubricate or brush grease on the upper, lower and side surfaces of the extensions.*

DISMANTLING THE SLEW MECHANISM

Refer to Safety instructions while servicing

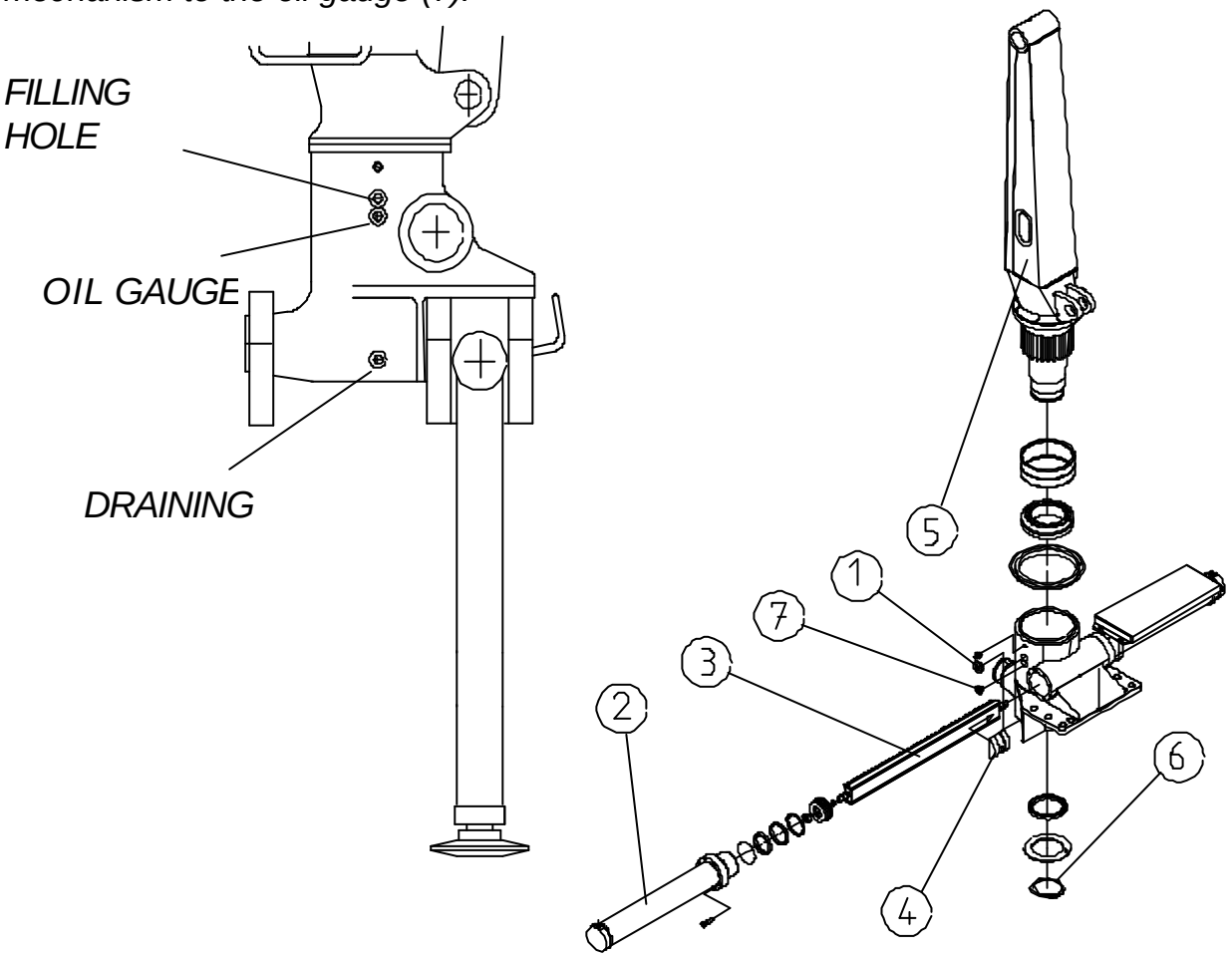
** Slew the booms to center position.*

** Drain the oil from the slew mechanism into a vessel by opening the draining and filling plugs (1).*

** Remove the barrels (2) and drain their oil into a vessel. The rack bar (3) and the thrust bearing (4) can be removed without removing the pillar.*

** The pillar (5) can be lifted away by removing the base plate (8), the locking ring (6) in the bottom side and the hoses going through the pillar. The pillar can be removed without removing the slew cylinders and rack bars.*

** Assemble in reverse order and finish by adding hypoid oil 80W90 into the slew mechanism to the oil gauge (7).*



DISMANTLING THE OUTER BOOMS (models with single and double extensions)

1. Extend the extensions about 30 cm.

2. Detach the extension cylinder from the outer boom and the hydraulic hoses.

3. Remove all glide pads from the mouth of the outer boom.

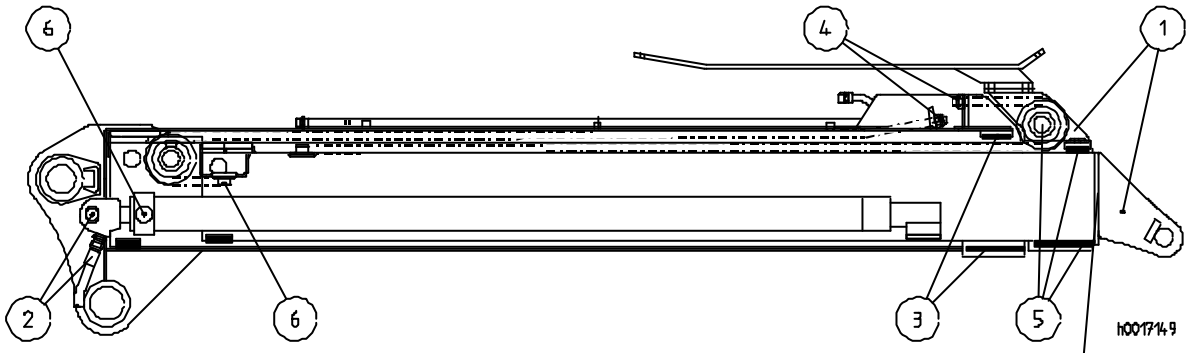
4. Open the tightening nuts of the chain pairs and pass the back chain including clamps through the opening and then out through the mouth of the outer boom. At the same time the whole extension package can be pulled out from the outer boom.

5. The outer extension can be dismantled in the same way: remove all glide pads and the chain gear from the mouth of the inner extension. Guide out the chain via the mouth of the opening.

6. Remove the extension cylinder and the tightening fork of the back chain and pull out the extension.

7. For a model with single extension perform steps 1...3.

8. Assemble in reverse order.



Min. 10mm distance between the fastening

ADJUSTING THE CHAIN TENSION (models with double extension)

** Extend the extensions fully and then retract them some, so that the visible chain becomes slack.*

** Tighten both chains equally. The tension is correct, when the chain will flex about 2...3 cm, when pushing downward at the center of the chain by hand.*

ADJUSTING THE CHAIN TENSION (models with double extension)

** In praxis the chain loading and stretching will be highest inside the booms (because it pulls the extension). Retract the extensions and adjust the fastening space between the outer and inner extension fastenings with nuts (4) to about 10 mm.*

** If tightened too much, the chains and chain gear bushings will wear.*

** A too slack chain may break, when it gets to run on the edge of the chain gear.*

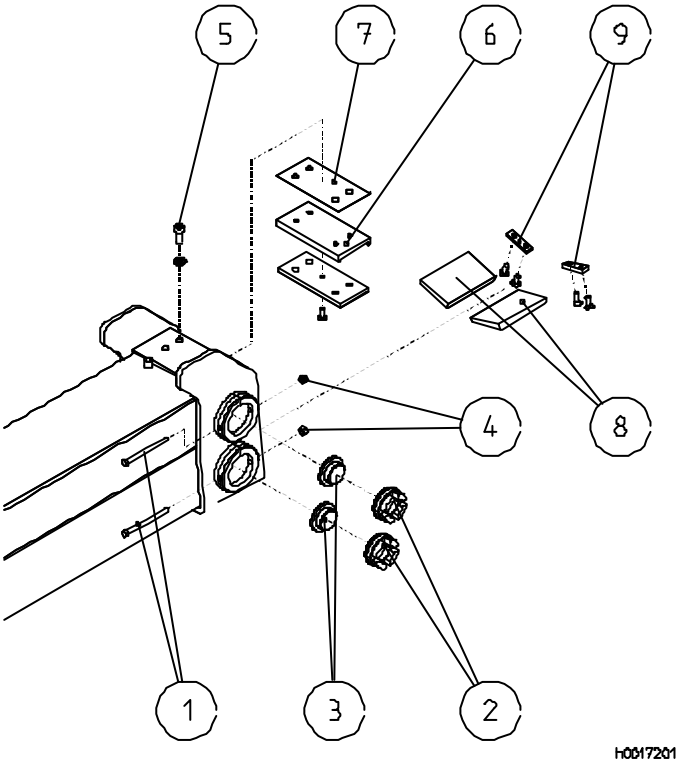
ADJUSTING THE HORIZONTAL CLEARANCE OF BOOM EXTENSION

** Remove the locking screw (1) of the side glide pad.*

** Turn the glide pad clamp (2) clockwise equally on both sides of the boom, until there is no gap.*

** If this does not eliminate the gap, the glide pad (3) is worn out and must be replaced.*

** Loosen the clamp (2) back to previous lock position. Put back the lock screw (1) and lock with nut (4).*



ADJUSTING THE VERTICAL CLEARANCE OF BOOM EXTENSION (in models with single and double extension)

** Open fixing bolts (5).*

** If needed, add adjusting shims (7) between the glide pad clamp (6) and the upper surface of the boom (use 1 or 2 shims).*

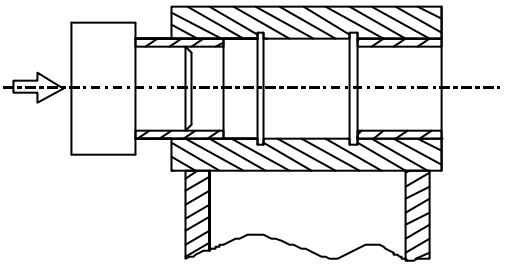
** There is no adjusting space left, when the bottom glide pads (8) are worn to almost the same level as the lock plates (9). If so, change the glide pads.*

NOTE! The glide pads must have a small working clearance to allow the extensions to move. Overtightening will only cause excessive wear.

REPLACING THE SLIDING BEARING

Refer to Safety insturctions while servicing.

** The booms are equipped with so called thin box sliding bearings, which are long lasting if correctly lubricated.*



** When the bearing is so worn that there is a distinct gap in the link, remove the pin and the old bearings by opening them at the seam with e.g. a wedge.*

** Use a suitable mandrel when installing a new bearing, to prevent damaging the bearing end.*

** Also check that possible lubricating holes are opposite each other.*

** Prior to pin mounting, check its condition and lubricate the new bearings according to recommendations.*

REPLACING HYDRAULIC COMPONENTS

** When replacing hydraulic components, like hoses,pipes, seals etc., make sure that the new components correspond with the factory installed ones.*

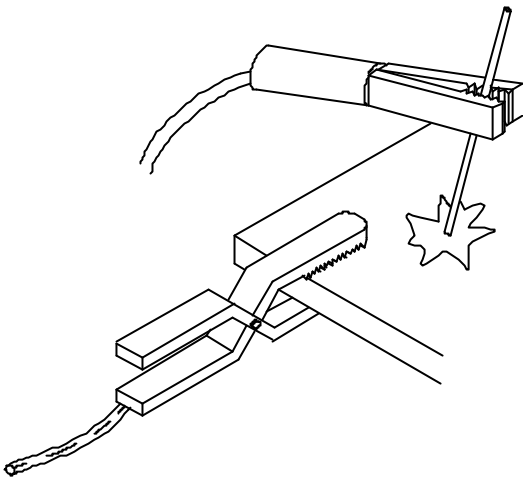
** Original spare parts are the best insurance for safe and undisturbed function.*

** Keep the hydraulic system of the crane in good condition and replace defect parts, e.g. hoses, pipes etc. in good time.*

REPAIR WELDINGS

Do not ever modify the crane structure or weld supplementary parts on it without the manufacturer's permission.

If modifications or repairs are done by welding, observe following:



** The welder must be fully qualified, quality class WC.*

** Remove paint and grease from the area to be welded.*

** Always connect the earth connector to the part to be welded, no joints in between!*

** The suitable electrode is OK 48.30 or equal. Use dry electrodes.*

** Use OK Autorod 12.51 or equal for MIG / MAG welding.*

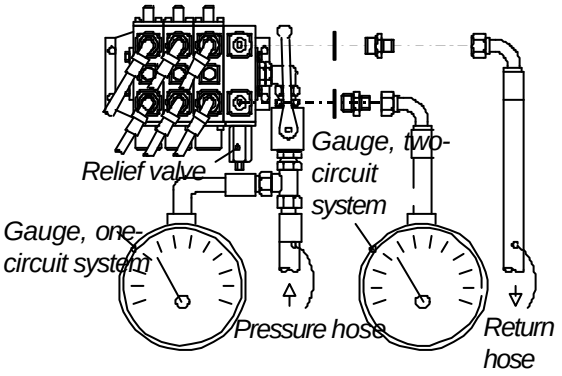
PRESSURE MEASURING

Refer to Safety instructions while servicing.

** When checking the pressure the hydraulic system must be in normal working temperature and producing a normal flow (about 60 l/min).*

1. System pressure (P1)

** Connect the gauge to the pressure measuring coupling at the pressure end of the control valve or with a joint to the pressure hose.*



** Start the pump and engage the retract-function of the extension (with extensions retracted).*

** Read the system pressure. (Compare with the main pressure in the hydraulic scheme.)*

** Release the levers to their middle position*

and read the return pressure.

2. PRESSURES OF THE WORKING MOVEMENTS (P2)

** The pressure of each working movement (raising, outer boom functions, slewing, extension, grapple, rotator) is achieved by driving each function toward its limit with the control lever.*

** If the pressure setting of the relief valve for the function in question is less than the crane working pressure, the valve should open. The opening pressure may exceed the hydraulic scheme setting with max. 5 %.*

** If the pressure setting of the relief valve for the function in question is higher than the crane working pressure, the function can be measured by changing the main relief valve to a 250 bar relief valve for the time of measuring. The setting of the pump relief valve must also be 250 bar during the measuring.*

** Compare the measuring result with the hydraulic scheme. Replace the relief valve, if needed.*

Never raise the pressure settings of the control valve. It may cause overload and damage the crane.

STORING

If the crane is to be stored for a longer period, carry out following preparations:

** Clean the crane thoroughly with e.g. a pressure washer.*

** NOTE ! Never clean electric components with a pressure washer.*

** Lubricate all service spots after washing, to remove any possible water from the bushings and to prevent corrosion.*

** Oil the visible piston rods and valve levers with e.g. spray.*

** Check the oil quantity of the slew mechanism and add, if necessary. Drain some oil from the draining plug to eliminate possible condensed water.*

** Drain some oil from the quick coupling. If the storage temperature will rise (winter → summer), the oil volume will increase and the system will get pressurized.*

** Brush paint on the spots, where it is cracked or worn.*

** Repair all faults and defects to ensure that the crane will be in faultless condition when retaken into use.*

STORING

** Store the crane with the slew mechanism in upright position and support it properly, to prevent it from tipping over.*

** It will be of advantage to store the crane away from sunlight, preferably under roof.*

** When retaking the crane into use, clean the piston rods, check the slew mechanism oil, the mounting bolts of the crane and the safety equipment function.*

DISCARDING

When the crane is coming to the end of its service life and is no longer repairable, it shall be withdrawn in a way, which will cause no needless harm to the environment.

1. Deliver the machine to a scrapped goods treatment plant, where it will be dismounted under surveillance.
2. If dismounted by yourself:
- Drain all the oil from the hydraulic system and slew mechanism and send the oil to a waste oil treatment plant.
- Remove the hydraulic hoses and send them to a waste (recycling) rubber collecting place.
- Send the metal parts to a capital scrap collector.

TERMS OF WARRANTY

KESLA OYJ gives a manufacturer's warranty for Foresteri truck loaders as stated below:

* *Tvelwe (12) months from the date of delivery to the end user. The warranty is valid for new products only for the above stated time while in the possession of the first owner.*

* *The warranty will cover any defects in the machine or its accessories due to structural failures, faulty raw materials or workmanship. The defective part in the machine or accessory is replaced free of charge with a new or reconditioned part by the guarantor.*

* *The warranty shall not apply to hydraulic hoses and their connectors or hydraulic oil seals. For purchased components Kesla Oyj will pass on a warranty that is equal to the warranty given by the subject component's manufacturer to Kesla Oyj.*

* *The warranty shall not apply to any faults or defects arising from normal wear, negligence or improper operation, faulty installation or incorrect or inadequate care and maintenance.*

* *Kesla Oyj will not assume any liability for any economical losses which the purchaser may incur through a failure of the product or for any consequential damage to persons or property resulting from a failure of the warranted product.*

* *Warranty shall be invalidated if any repairs to the warranted product have been made by others than the manufacturer or the manufacturer's sole representative. The warranty shall be invalidated also if the preset pressure settings have been altered.*

* *A written warranty claim for the defective part must be submitted to the guarantor within a period of thirty (30) days at the most from the date of reparation.*

  The warranty claim form must always be filled with the following information:

  - *make and model*
  - *machine number*
  - *date of delivery to the client*
  - *date of reparation*
  - *description of the defect*
  - *name, address and telephone number of the client*

- reference number of invoice or Bill of Material of the exchanged spare parts

KESLA OYJ

START-UP

INSPECTION

The start- up inspection must be performed immediately after assembly, before taking the crane into use. An authorized installation firm shall fill in the inspection record, which shall then be signed by the inspector and the client. The first part will be given to the client, second part returned to the manufacturer, and the third part remains with the assembly shop.

Owner:	Crane type	Serial No.
Vehicle make, model and registration No.		Manufacturing year

CHECKS BEFORE TRIAL RUN	Appr.	Repair	Repair appr.
1. The crane has the correct service and operation manual			
2. Stability determined according to Finnish standard SFS 4677			
3. Warning decals, load and type plates			
4. Fitting of the crane			
5. Movement of the control valve spools and returning to middle pos.			
6. Fitting of hydraulic pumps and condition of universal shafts			
7. Hydraulic system of the truck suitable for the crane			
8. Pressure and return filters			
9. Quick couplings of hydraulic system in order and connected			
10. The amount and type of hydraulic oil in order, amount of oil in slew mechanism			
11.			

WORK AND TRIAL RUN			
1. Lubrication of links, bearings and cables			
2. Air venting from the system by driving all cylinders to their extreme positions without load 4...5 times			
3. Trial run according to Finnish standard SFS 4261			
4. Correct movements of the levers and crane			
5. All crane movements go to extreme positions			
6. Checking the operation of the relief valves			
7. Booms do not lower by themselves			
8. Operation of the emergency stop system			

INSPECTIONS AFTER TRIAL RUN			
1. No oil leakages			
2. Hydraulic oil temperature does not rise excessively			
3. Fitting has been performed according to directives and standards and the CE mark has been attached to the vehicle			
4. The crane operator is familiar with the instruction manual			

REMARKS:

Date	Installation firm

Client's signature	*Installator's signature*

KESLA OYJ

PERIODICAL INSPECTION

The periodical inspection shall be carried out once a year and the trial run according to standard SFS 4261 every 4 years. An authorized installation firm must fill in the inspection record, of which the first part will be given to the client and the second part remains with the installation firm. The inspection record must be filed with the crane.

Owner:	Crane type	Serial No.
Vehicle make, model and registration No.		Manufacturing year

GENERAL INSPECTION	Appr.	Repair	Repair appr.
1.The crane has the correct service and operation manual			
2. The construction corresponds to original			
3. Warning decals, load and type plates			
4. The way to operator's seat and fixing of seat			
5. The condition and protection of control equipment			
6. Fitting of the crane			
7. Rear fitting stand and stabiliser legs			
8. Slew mechanism and pillar			
9. Booms			
10. Axles, links and lockings			
11. Hydraulic hoses and sleeves			
12. Cylinders			
13. Link, rotator, grapple			
14. Booms do not lower by themselves			
15. Operation of the emergency stop system			
16.			

TRIAL RUN ACCORDING TO FINNISH STANDARD SFS 4261			
1. Test loading			
2. The movements of control levers and their returning to middle position			
3. Operation of relief valves			
3. Condition of structures after trial run			

REMARKS:

Place	Installation firm
Date	Installator's signature